March 1947

Chemical Industries

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HOUSTON SHIP CHANNEL — Focal Point of Southwest chemical developments

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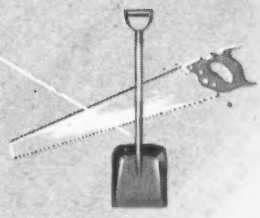

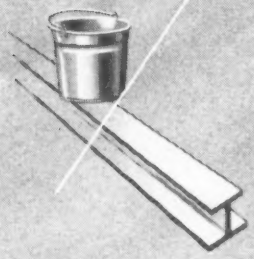

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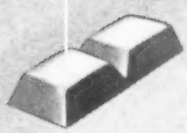

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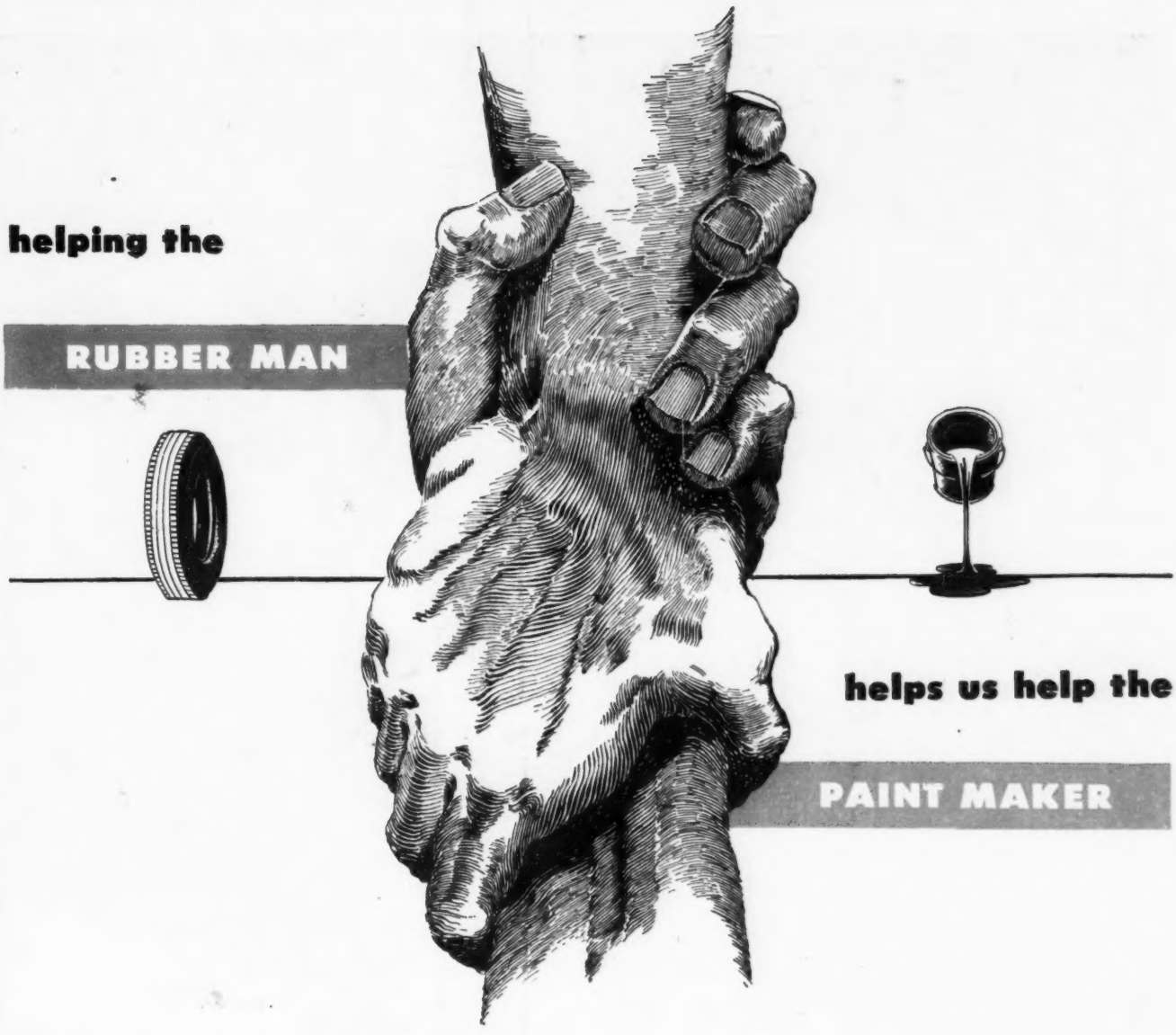

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THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 60
NUMBER 3

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COVER:
Extending 50 miles across the Texas coastal prairie, the Houston Ship Channel is a major commercial artery.

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THE READER WRITES

Repeat Tariff Mistakes?

To the Editor of Chemical Industries:

I have personally admired some of your editorials on free international trade in recent years, although from the selfish point of view I might have had reasons to favor high tariffs.

A recent release by the Department of Commerce has again stressed the gravity of the situation. In 1946, the United States provided foreign countries with more than twice as much in goods and services as it got from them. This figure is very close to the one in 1945 when lend-lease was in effect for which no payment was asked. There is, of course, nothing wrong with exports *per se,* but let us see how the excess in 1946 was financed by the foreign governments. We find that 3.5 billions were borrowed, 3.2 were gifts by the U. S. government and private institutions, and 1.4 billions were from their own gold and dollar balances. The above figures refer to the excess of 8.2 billions above the 7 billion dollars' worth of goods and services which we did import.

Shall we repeat the mistakes of the twenties? How much longer should we stress the basic principle that we must import in order to export? The road ahead is clear. We should either adopt a "courageous lending policy" to pay for the exports or lower the tariff barriers. While continued tariffs on some chemicals and allied products may be justified for various well known reasons, they should be lowered for the bulk of them by means of bilateral agreements. The sentiment, unfortunately, is one of "it is all right for the others, but I want protection." The United States is in an admirable position to do tariff bargaining and help reduce tariffs throughout the world. But the example should come from home. It is my belief that American technology, automatic control equipment and brains should accept the challenge of foreign manufacturers. And if the latter can sell cheaper without dumping or other unfair practices, it is the American consumer who will win out. Since the chemical industry is its own "best consumer" the challenge is clear.

Let us look above our selfish interests and see the alternatives. Should we prefer greater economic stability in the world at large, cheaper goods, and hopes for the repayment of loans already floated, or economic isolationism harboring the virus of another war and artificial prosperity backed by lending of money so that others can buy? We know that we must export to be prosperous, but oftentimes seem to forget that we must import in order to export.

ROBERT S. ARIES
Polytechnic Institute of Brooklyn
Brooklyn, N. Y.

"For Bosses Only"

To the Editor of Chemical Industries:

I thought Ernest N. May's article, "For Bosses Only," in your January issue was extremely interesting. I hope it gets the attention it deserves.

PHILIP A. SINGLETON
Monsanto Chemical Co.
Washington, D. C.

A Better Mousetrap

To the Editor of Chemical Industries:

Your editorial in the December issue, "Something to Sell," leads me to wonder if you shouldn't have placed your emphasis a little differently. While the main thesis of the editorial is devoted to the idea of selling the free enterprise system, you do mention in one line that "What seems indicated at the moment is a greater cooperative effort to strengthen its weak spots."

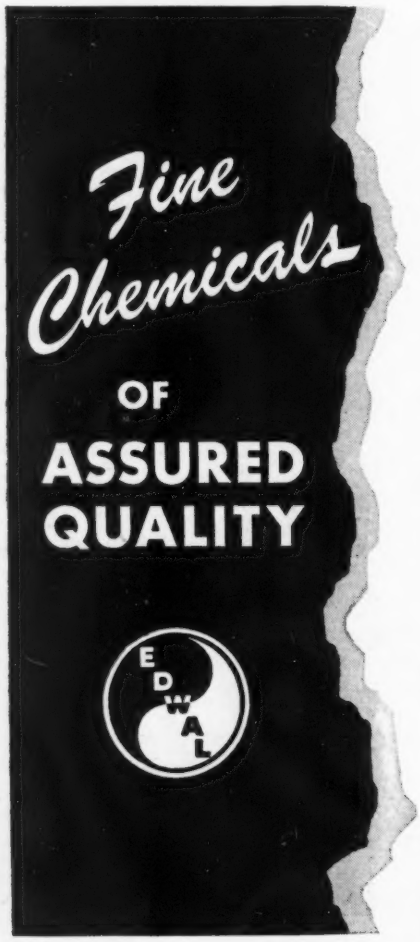
What we need is not a greater selling effort, but a greater effort to overcome the weaknesses of the system. If our system is the best one, it will sell itself, and if it isn't no amount of high pressure salesmanship or propaganda will keep it long afloat.

Why is it that practically all past improvements in the system, from the standpoint of those to whom you are trying to sell the idea, have had to be forcibly brought about by these same people?

A few far-sighted businessmen have seen the light. They are the ones who are now trying to take the lead in bringing about a strengthening of the weak spots so that the system will sell itself on its own merits. If the rest of big business does not follow their lead, it will be but a matter of time before other ideologies which promise to overcome these weaknesses will be accepted by those who are affected.

KARL E. BUFF
Detroit, Mich.

We agree with Mr. Buff on all points except the assertion that if the system is good it will sell itself. Many good products and good ideas have lost out to less deserving ones because somebody else did a better selling job. A good sales program is no substitute for a good product, but it does assure the product of getting the consideration it deserves, which is no less important.—Ed.



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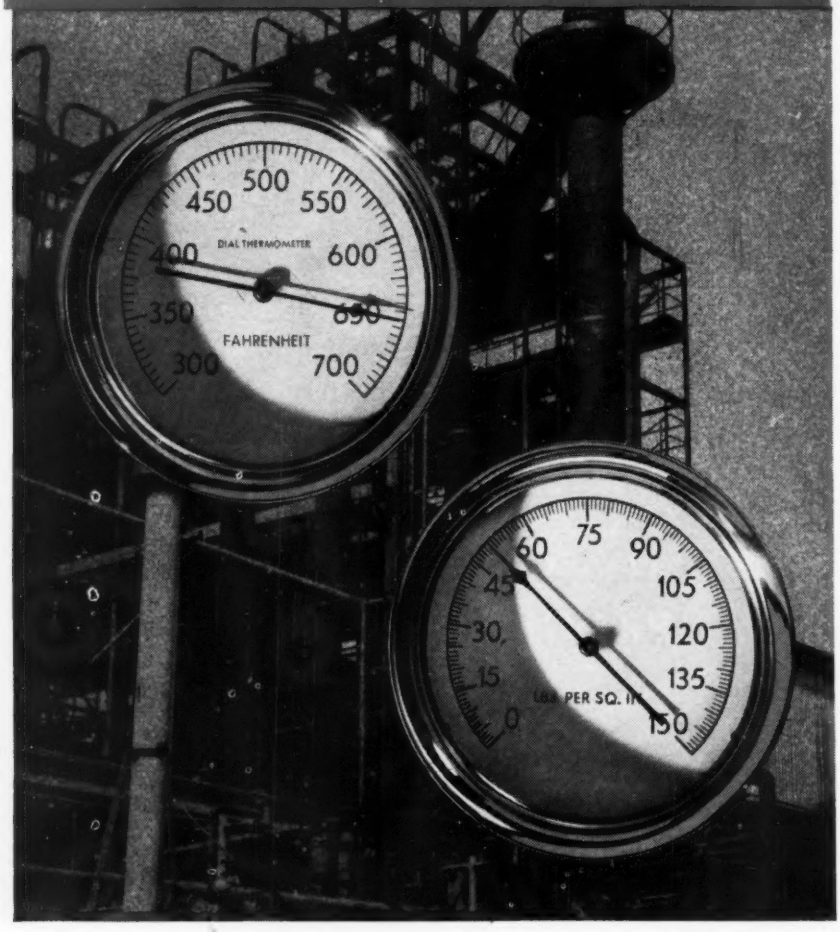

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Disinfectants Produced from Phenol Derivatives

Phenol derivatives are now being used in the manufacture of many disinfectants. These phenol products, produced by Dow, are known as Dowicides. They are noted for their high germ-killing powers which are largely retained in the presence of organic matter. Other important properties: excellent compatibility with cresols, pine oils, and soaps, and effectiveness under alkaline conditions. These qualities indicate the wide adaptability of Dowicides to the manufacture of bactericides and fungicides.

Propylene Glycol Used as Shortening Extender

The food industry is making increasing use of low-cost Dow propylene glycol because of its unusual properties as a solvent, humectant, preservative, and wetting agent. Through the wetting action of this highly purified material it has been found possible to extend the effectiveness of shortening in producing baked goods. Propylene Glycol aids in the dispersion of the shortening throughout the batch with a consequent saving of critical shortening not otherwise possible.

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WASHINGTON

T. N. SANDIFER *reporting*

Fats and Oils Negotiations . . . Occupational Deferments . . . Sulphur Export . . . Container Prospects . . . Molasses Imports . . . Naval Stores Inspection . . .

CPA Handles Occupational Deferments

APPLICATIONS FOR DEFERMENT of the following classes of registrants, which formerly were subject to certification by the Office of Scientific Research and Development, should now be addressed to Civilian Production Administration at Washington.

Qualified and irreplaceable production workers in CPA-certified "critical" industries; supervisory, technical, and scientific personnel in essential industries; research workers in the physical sciences or engineering employed in industrial or foundation research not directly connected with production.

Export Demand To Hit Containers

WHILE IT IS unlikely that any tinplate produced in March will be affected, domestic orders have been adversely affected by projected export quotas of tinplate for containers covering April and May.

The bulk of tinplate produced in this country is now earmarked for packaging food crops and essential products, so that curtailed deliveries may be in other products deemed less essential. Of currently scheduled production, 270,000 tons of plate are for oilcans. No specific products has been mentioned in connection with cuts, this apparently being left to can manufacturers.

However, sources here would not be surprised to see efforts later in the Spring to increase the current tonnage of tinplate allocated for export, in which case the pressure on domestic packaging may be increased.

FTC and Sulphur Export Corporation

REPLYING TO A report by the Federal Trade Commission making certain recommendations for readjustment of operations of Sulphur Export Corporation, an export trade association under the Webb-Pomerene Act, representatives of the association pointed out this month that most of the recommendations are "academic" because they are concerned with practices discontinued years ago.

The FTC recommendations in substance were that the corporation "refrain in the future from formulating or participating in agreements with foreign or domestic producers of sulphur which the Commission found to be in violation of antitrust laws."

The Corporation stated that the recommendations "relate to practices and agreements which were discontinued by voluntary action of the Corporation 5 years before the Commission began its investigation in 1945."

"Thus," said Clarence A. Snider, president of the Corporation, "the recommendations issued by the Federal Trade Commission are academic and require no change in our present activities."

New Naval Products Inspection Fees

GOVERNMENT INSPECTION fees ranging up to 15 percent above former rates became effective on turpentine and rosin January 26, and on other naval stores February 1. Those who require detailed information on the schedules involved can obtain it from V. E. Grotlisch, Production and Marketing Administration, U. S. Department of Agriculture, Washington.

CCC Negotiates For Fats and Oils

THE COMMODITY CREDIT CORPORATION of the U. S. Department of Agriculture has reentered the import situation with respect to fats and oils, particularly linseed and drying oils, following refusal of the Argentine Government to sell linseed oil to private U. S. importers.

The C. C. C., however, was forced to ask bids from American importers before it could go further with negotiations at Buenos Aires, because the Argentine price was above the market, and the Corporation wanted assurance from the American buyers that it could contract for the oil and get its money back when the commodity was sold to private channels in this country.

This oil may cost around 37 cents per pound in tank cars, duty paid, in the New York area. Linseed crushers have indicated that at such a price, their requirements would not exceed 40,000 long tons, with shipments divided over the period February-May, inclusive.

United States authorities are having considerable difficulty in getting oils on which to base commitments to domestic consuming industries and have frankly indicated that the best prospect of sufficient linseed oil for American use lies in the augmented planting of flax.

The basis on which copra and coconut oil will be imported under government license for the first quarter provides for an initial permit, for 10,000 tons of copra, restricted to domestic use, to any individual oil seed crusher who has previously crushed copra. Similar authorization will be issued to established importers of coconut oil. Importers may then receive a second license upon showing that arrangements have been made for purchase of the quantities allowed in the first authorization.

Permits for trans-shipment of these commodities in bond through the United States to specified foreign designations will be granted if the amounts conform to the allocations for such countries.

Blackstrap Molasses Shipments

AS A RESULT of removal of allocation controls February 26, the reconstruction Finance Corporation expects to have available for sale to industrial consumers this year, between 80,000,000 and 85,000,000 gallons of Caribbean blackstrap molasses, depending upon shipping facilities.

U. S. Dye Exports To Brazil

THE UNITED STATES supplied 332 of the 414 metric tons of coal-tar dyes imported by Brazil in January-June 1946, according to statistics of the Brazilian Ministry of Finance. Total imports were worth $1,505,750, and those from the United States, $1,010,600.

Imports of intermediates for dyes amounted to 62 tons in the first half of 1946; the United States furnished 46 tons. Values were $127,000 and $92,900, respectively.

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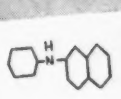

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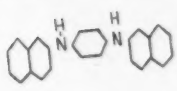

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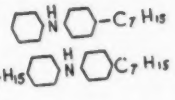

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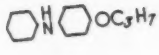
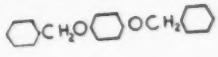


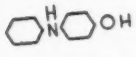
Isopropoxy Diphenyl Amine

Available in commercial quantities
M. P. 78°
Purity 92% min.



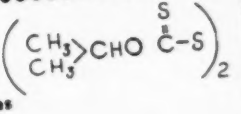
Dibenzyl Ether of Hydroquinone

Available in Pilot Plant quantities
M. P. 119°
Purity 85%



p Hydroxy Diphenyl Amine

Available in commercial quantities
M. P. 150
Purity 92%

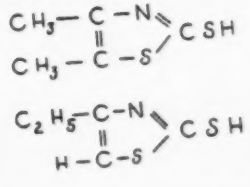


Di Isopropyl Dixanthogen

Available in commercial quantities
M. P. 52°
Purity 98%

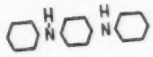
N-Nitroso Diphenyl Amine

Available in commercial quantities
M. P. 62°
Purity 97%



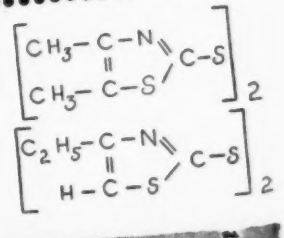
Mixed Ethyl and Dimethyl Mercaptothiazoles

Available in commercial quantities
M. P. 136-153°
Purity Approximately 85% dimethyl and 15% ethyl mercaptothiazoles



Diphenyl p Phenylene Diamine

Available in commercial quantities
M. P. 144°
Purity 92%



Mixed Aliphatic Thiazyl Disulfides

Available in commercial quantities
Liquid

For additional information please write B. F. Goodrich Chemical Company, Department CE-3, Rose Building, Cleveland 15, Ohio

B. F. Goodrich Chemical Company A DIVISION OF THE B. F. GOODRICH COMPANY

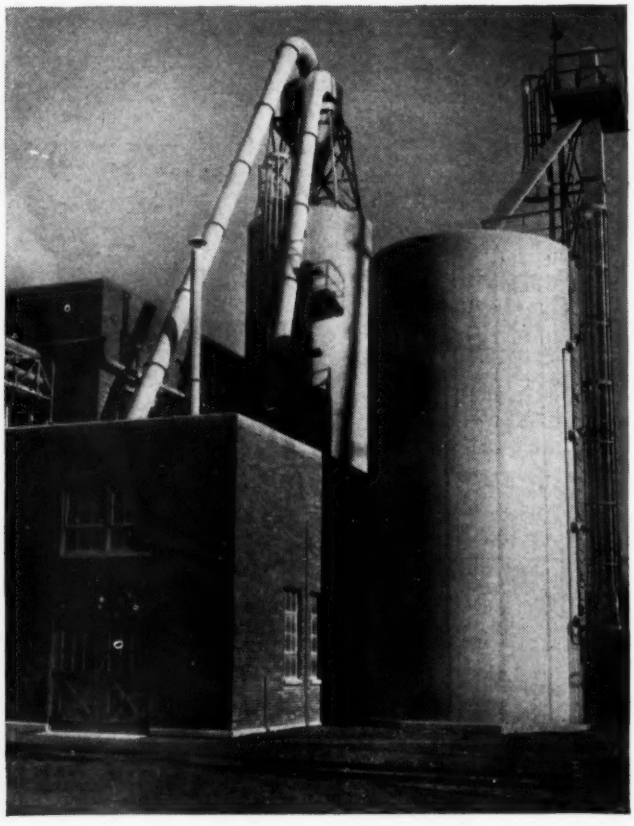
Life...on the

NEW CYANAMID PLANT INCREASES SUPPLY OF ALUMINUM SULPHATE

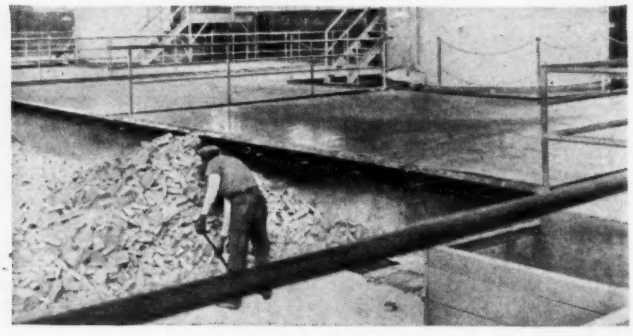
Cyanamid's new alum plant at Hamilton, Ohio, adds another modern source of supply to the company's other strategically located plants manufacturing this important industrial material. Here the most recent innovations in processing equipment and methods are employed to assure to the users of alum a product of the highest standard of quality and uniformity. All possible operations are automatic, and are coordinated under expert supervision to maintain smooth-running operation. This rigid control extends through every step in the production of aluminum sulphate in all forms . . . slab, liquid, lump, or ground. . . . Incidentally, standardization of boiler water is achieved through the use of Cyanamid's IONAC* Resin Ion-Exchange Equipment . . .

(*Below*) **SHOWN HERE** is a boiler-water analysis being made after water has been standardized through the use of Cyanamid's IONAC Resin Ion-Exchange Equipment.

(*Below*) **BAUXITE ORE** is stored in the silo on the right and ground in the building on the left. The resulting ground product is stored in the silo in the background.



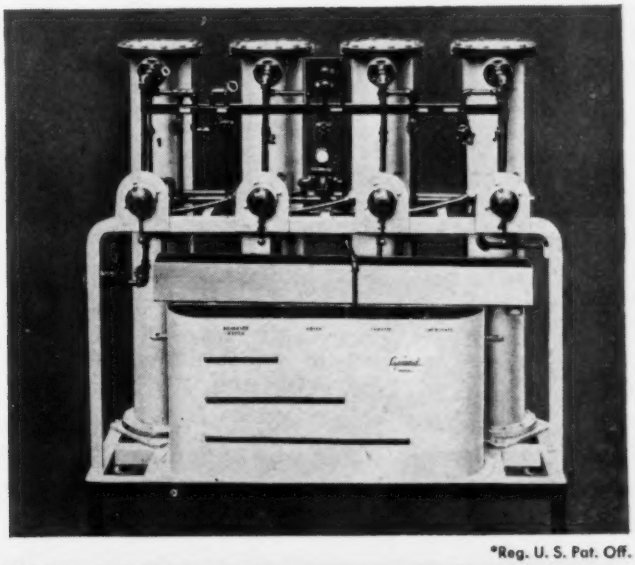
(*Below*) **IN THE DRY ALUM** building at Cyanamid's new plant at Hamilton, Ohio, liquid alum is cooled on the pan in the background. When it has hardened, it is chopped and pushed down onto the lower platform from which it is loaded on a conveyor belt which carries the alum to the grinder.



Chemical Newsfront

(*Above*) **THE WELL KNOWN DAIRYCO BRAND OF ARGENTINE CASEIN** is imported exclusively by Cyanamid. It is a dependable, high quality material to augment our quality domestic casein which Cyanamid supplies manufacturers of many products, including coated paper, rubber, plastics, glue, cold water paints, simulated wool fibers, amino acids, insecticidal sprays, textiles, soap and cosmetics, ceramics and dyes, matches, linoleum and oil cloth.

(*Right*) **THIS FILT-R-STIL*** Water Demineralizer, Model L-150, delivers the chemical equivalent of distilled water *without heat*, and at a fraction of the cost of distilled water. This compact, completely-assembled unit is delivered ready for immediate operation, at a maximum flow rate of 150 gal./hr. Many other types and sizes of FILT-R-STIL water demineralizing units, however, employing Cyanamid's ion-exchangers, known as IONAC Resins, are available to meet every requirement for mineral-free water.



(*Right*) **HERE'S A NEW LAMPSHADE MATERIAL** that's both functional and ornamental. Made of LAMINAC* resin, product of Cyanamid's Plastics Division, and glass fibers, it's called Clairene, and is made by Impression Molding, Inc.

*Reg. U. S. Pat. Off.

AMERICAN Cyanamid COMPANY
Industrial Chemicals Division
30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

in the field of SILICOFLUORIDES . . .

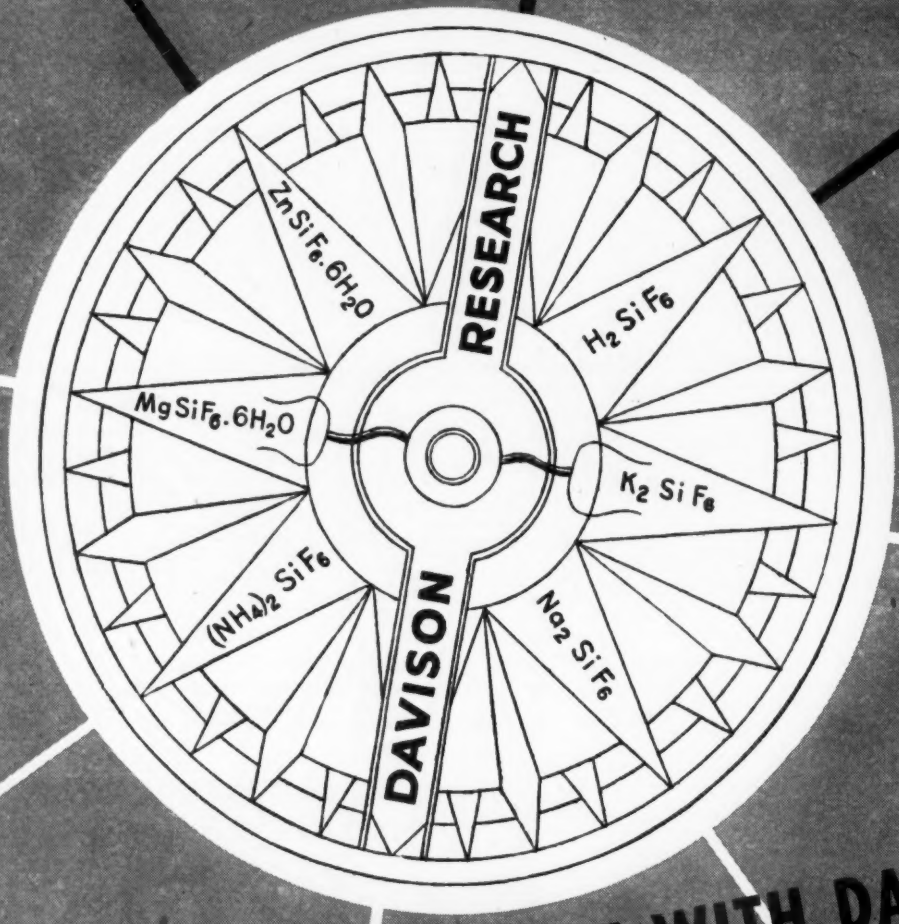


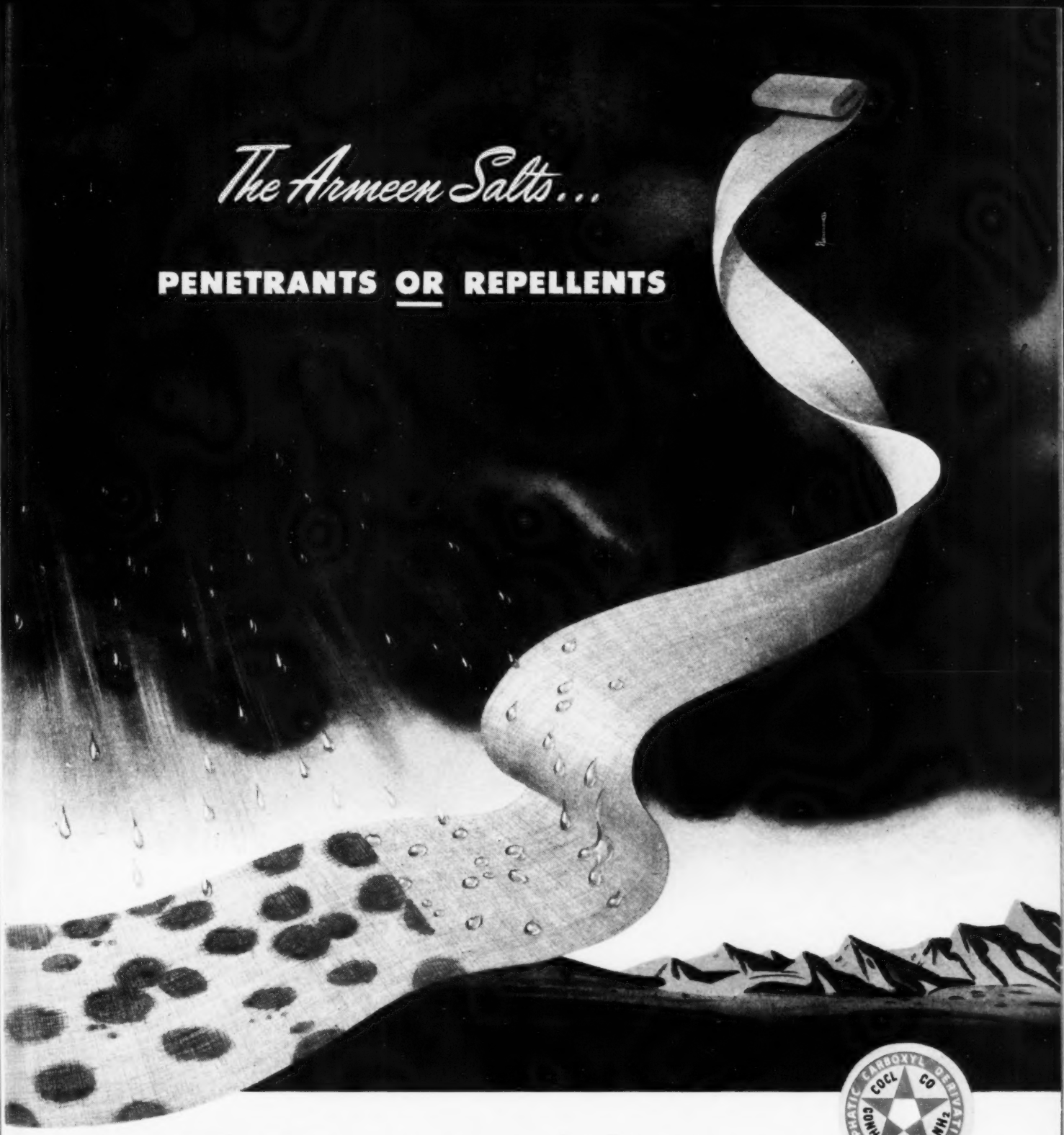
CHART YOUR COURSE WITH DAVISON

Credited with having produced the first ammonium silicofluoride in the United States on a commercial scale, Davison has taken a leading position in the field of hydrofluosilicic acid and its salts from the beginning . . . maintaining this leadership through consistent research and accumulation of know-how. If the problem involves hydrofluosilicic acid and its salts, consult Davison with confidence.

THE DAVISON CHEMICAL CORPORATION

Progress through Chemistry

BALTIMORE 3, MARYLAND.



Penetrants or Repellents—the choice is yours, for the Armeens (high molecular weight aliphatic amines) are remarkably versatile. So versatile, in fact, that they merit consideration for your products or processes.

Neutralized with certain acids, Armeens form unique and interesting salts . . .

As Penetrants . . . Because a long straight carbon chain is present in these fatty amines, they form surface-active compounds when water-solubilized by neutralization with monovalent acids such as acetic or hydrochloric. They then aid the penetration of water into such materials as wood, textiles, ceramics, etc.

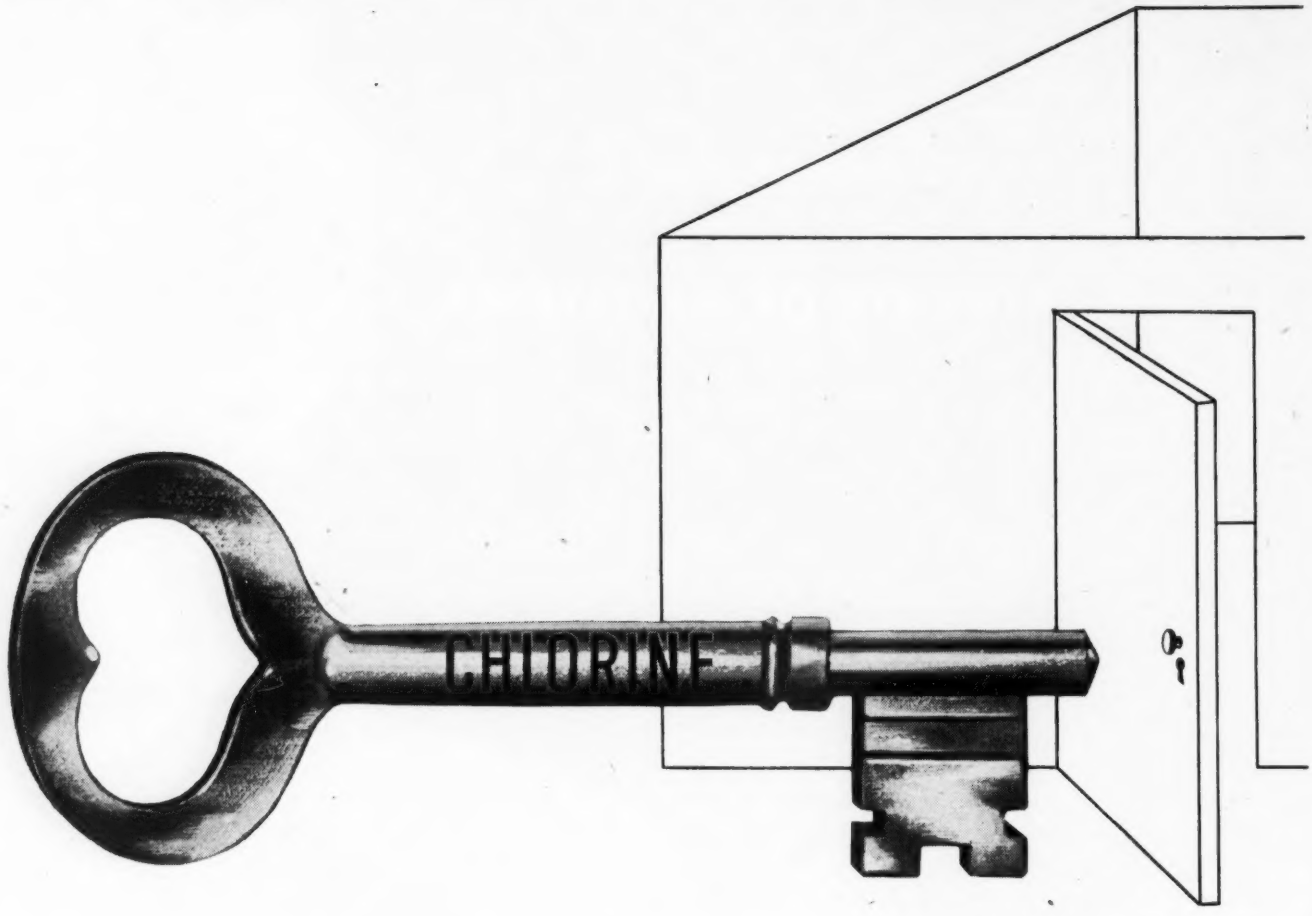
As Repellents . . . Neutralization with the proper acid or double-decomposition with the proper salt converts the Armeen penetrants into repellents. Di- or polyvalent mineral acids or their salts, or higher molecular weight organic acids form water-insoluble Armeen salts which effectively repel water from such materials as textiles, ceramics, etc. Such Armeen salts wet easily with napthas and oils without dissolving in them.

Upon request we will send you our new bulletin, **"The Armeen Salts—Penetrants or Repellents"**, describing the properties and characteristics of the Armeens and their salts.

ARMOUR
Chemical
DIVISION

Armour and Company

1355 West 31st Street • Chicago 9, Illinois



opening new doors

Research is finding Chlorine a useful key to the synthesis of other chemicals, especially organic materials. Wider and wider becomes the range of the services that Chlorine renders to the development of our civilization. It is an important agent in the manufacture of the newer insecticides, bactericides and weed-killers—and it's finding new uses in the fields of solvents, protective finishes, synthetic detergents and plastics. Chlorine continues to be important for sterilizing food equipment . . . bleaching pulp, textiles and other products.

Wyandotte Chemicals Corporation—one of the world's great producers of Chlorine—is alert to the promise of this chemical. So users of Chlorine can continue to look to Wyandotte for expert, up-to-the-minute service. A request for advice about the adaptability of Wyandotte Chlorine to *your* purposes will receive careful attention.

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN • OFFICES IN PRINCIPAL CITIES

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine
Hydrogen • Sodium Zincates • Aromatic Intermediates • Dry Ice • Other Organic and Inorganic Chemicals

Wyandotte
REG. U. S. PAT. OFF

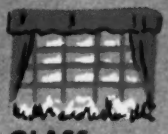
EXPLOSIVES
Soda Ash

PETROLEUM
Soda Ash
Caustic Soda
Silicate of Soda

RUBBER
Caustic Soda
Calcium Carbonate

ALUMINUM
Soda Ash
Caustic Soda

PULP and PAPER
Soda Ash
Caustic Soda
Chlorine
Calcium Carbonate
Chlorowax



GLASS
Soda Ash
Calcium Carbonate
Silicate of Soda

In the processing of America's most essential products

Diamond Alkalies

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Chlorine
Caustic Soda
Silicate of Soda

SOAP
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Caustic Soda
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Silicate of Soda
Bicarbonate of Soda
Soda Ash

CHEMICALS
Soda Ash
Caustic Soda
Bicarbonate of Soda
Silicate of Soda
Chlorine
Sodium Bichromate

TEXTILES
Soda Ash
Caustic Soda
Bicarbonate of Soda
Silicate of Soda
Chlorine
Chlorowax

MEDICINAL
Chlorine
Bicarbonate of Soda
Calcium Carbonate
Soda Ash

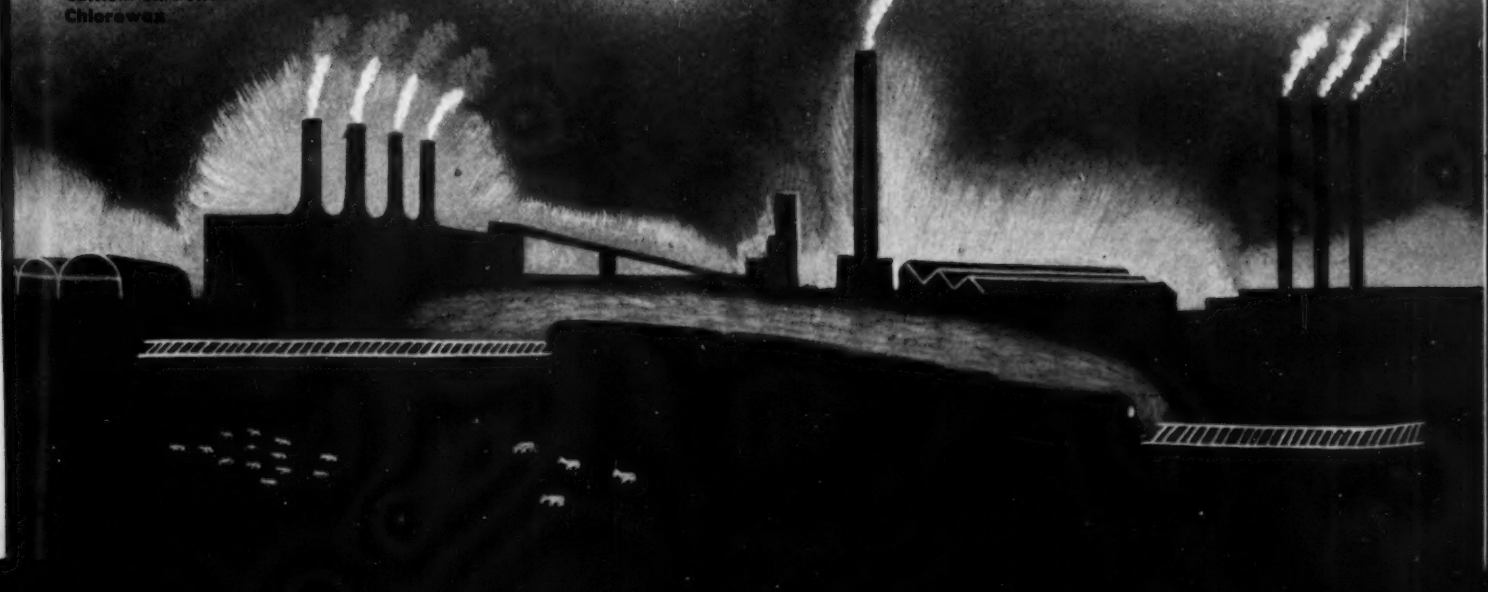
CLEANERS
Soda Ash
Caustic Soda
Sodium Silicates
Bicarbonate of Soda
Modified Soda
Carbon Tetrachloride

PAINT
Sodium Bichromate
Calcium Carbonate
Chlorowax

LEATHER
Bicarbonate of Soda
Sodium Bichromate
Soda Ash

DIAMOND ALKALI COMPANY

PITTSBURGH, PA. and Everywhere



FEATURED CHEMICALS in the PFIZER FAMILY

- Ammonium Oxalate
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- Bi-Cap Flour Enrichment Mixtures
- Bismuth Preparations
- Calcium Gluconate
- Citric Acid
- Citrate Esters
- Cream Tartar
- Fumaric Acid
- Gluconic Acid
- Glucono Delta Lactone
- Iron and Ammonium Citrates
- Iron and Ammonium Oxalate
- Iron Gluconate
- Iron Oxalate
- Itaconic Acid
- Niacin
- Niacinamide
- Oxalates
- Penicillin
- Potassium Iodide
- Potassium Oxalate
- Riboflavin
- Rochelle Salt
- Sodium Citrate
- Sodium Gluconate
- Tartaric Acid
- Thiamine

—and many other chemicals

no. 11 in a series:

NIACIN

NIACIN has earned widespread acceptance as a vitamin highly effective against certain deficiency diseases — notably pellagra. It is an ingredient of many established pharmaceuticals and of flour enrichment mixtures.

Chas. Pfizer & Co., Inc. adds the protection of an accepted name to the assurance of a performance-proved chemical. Along with other major vitamins produced at the company's Brooklyn plants, Pfizer niacin embodies the care and the experience for which its maker has been known . . . and known for nearly a century. Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y.; 444 West Grand Avenue, Chicago 10, Illinois; 605 Third Street, San Francisco 7, Cal.

PFIZER

Manufacturing Chemists Since 1849

ADVERTISEMENT—*This entire page is a paid advertisement* *Prepared Monthly by U. S. Industrial Chemicals, Inc.*

U.S.I. CHEMICAL NEWS

March ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1947

Sets Up Clearing House For Organic Compounds

Information concerning the thousands of organic chemicals synthesized each year will soon be readily available at a central clearing house, an official government publication announced recently. The clearing house is now being set up to record all new organic substances, keep a systematic file of their most important properties, and point the way to further research on their potentialities. A special coding system is being developed by a committee of 14 outstanding scientists in the field of chemistry, biology, and medicine in order to catalog adequately the physical, chemical, and biological properties of the numerous compounds to be listed.

Here's how the central clearing house will work for a manufacturer: Faced with the need for developing a specific fungicidal agent to protect delicate electronic equipment from deterioration in the tropics, the manufacturer submits specifications to the central clearing house. By means of the special coding system, information is rapidly obtained on compounds having the required characteristics. This information is then sent to the manufacturer, who is then ready to begin his developmental work.

Radioactive Phosphorus May Lower Fertilizer Costs

Radioactive phosphorus is being utilized for research on the fundamental principle of phosphate fixation and release by soils, it was revealed recently. Plants fed with fertilizer phosphate are often low in their use of this particular food, and it is hoped that this new tool, made possible by atomic research, will supply the answer to the low rate of recovery. Once equipped with the answer much higher rate of phosphate recovery may lie ahead, with consequent improvement in fertilizer efficiency and lower costs to the user.

New Petrolatum Test for Ductility Is Established

A new test, said to afford users of petrolatum for the first time with a means of determining the ductility of a petrolatum sample, was announced recently. The new ductility test is said to represent a radical departure from the hit-or-miss methods commonly employed in judging this property. The test is reported to give ductility a numerical value which will enable users to select a product suitable for a particular use.

Cuts Bodying Time of Oils

The bodying time of tung, crude oiticica, and similar vegetable drying oils is substantially decreased by treatment with infrared radiations, according to the claims made in a patent issued recently. In order to obtain the required degree of body in the decreased time, the oil is said to be exposed to radiations of prescribed intensity.

New Multi-Purpose Resin Is Now Readily Available

Aroplaz 1299 Used for Architectural-Type and Industrial Finishes — Also in Exterior Finishes When Extended with Additional Oil

A new resin, designed for use in architectural-type finishes, air-dry or low-bake industrial coatings and for exterior finishes when extended with additional oil, is now readily available from U. S. Industrial Chemicals, Inc. The resin is Aroplaz 1299 solution (75 per cent solids in mineral spirits), an oxidizing resin of medium-to-long oil length — hard resin modified, phthalic-free.

Aroplaz 1299, the now-available U.S.I. phthalic-free resin, is particularly useful in architectural-type coatings . . . in whites or colors — and the colors stand up!

Films of Aroplaz 1299 air-dry well overnight, or they can be baked in one hour at 250 degrees F. to glossy, durable finishes. Aroplaz 1299 is suitable for use in most whites, as well as in all tints and colors. It supplies good resistance to water, abrasion, and alkali, making it highly washable. Flexibility and adhesion of films are also good.

Supplied in Concentrated Solution

Aroplaz 1299 is produced in concentrated solution to permit reduction with a wide choice of solvents. Its viscosity is so adjusted that when reduced with mineral spirits or VMP naphtha to 50-53 per cent solids, a normal enamel vehicle viscosity of D-F (Gardner Holdt) will be obtained.

Finishes produced with Aroplaz 1299 which have been reduced with mineral spirits, or similar slow evaporating solvents possess excellent brushing properties. Those containing VMP naphtha as the reducing medium can be adjusted to give excellent spray coatings. The enamel-type finishes particularly are

(Continued on next page)

THE MONTH IN COSMETICS

Perfumed synthetic sponges are being produced in France . . . An alcoholic tincture of soap is an essential ingredient of a pleasant-smelling antiseptic telephone spray . . . Exclusive rights to the Scotch method of "cold" permanent waves is obtained by an American firm . . . A review of solid perfumes is published . . . A study of the properties and chemical structure of lactones is made . . . New-type filters, containing resin-impregnated cellulose elements which are said to remove particles as small as one micron from liquids with viscosities up to 600 S.S.U., are placed on the market . . . The use of ultra-violet lamps is cutting spoilage losses in the industry . . . A government report indicates that foreign markets absorb about 10 per cent of cosmetic production . . . Two catalytic methods of preparing paracymenes are patented . . . Cosmetic sales reach all-time high . . . Methods for the determination of the softening point of lipsticks are analyzed.

Mothproofing in Europe

A review of the recent advances in the mothproofing of woolen materials in Europe is contained in a booklet published recently. Material in the booklet is a compilation of reports, documents, and interviews made by the "Textile Team" and the "Chemical Team" of the U. S. Army's Technical Service Forces.

Alcohol Extraction of Soybean Oil Is a Success

The extraction of oil from soybeans by a continuous alcohol extraction process has proved so successful on a pilot-plant scale that a full-sized plant for applying this process has already been designed, the U. S. government announced recently. Industrial application is expected to lead to lower cost of oil extraction, greater safety in operation, higher quality of oil, and a more palatable soybean meal suitable for making soybean flour or for use in various food products, the announcement stated. In this process, the alcohol is recovered for reuse by chilling rather than by the more familiar method of distilling the alcoholic solution of oil.

Makes Long-Lasting Ice

A new type of ice, which is said to last 37 to 40 per cent longer than ordinary ice, has been placed on the market. The extended freeze-life is obtained by means of a chemical treatment which does not change the freezing point. In a test, several cars of carrots which formerly needed re-icing in transit, needed no re-icing with this new material.

ADVERTISEMENT—*This entire page is a paid advertisement*

March ★ **U.S.I. CHEMICAL NEWS** ★ 1947

Patents Two New Grease Removers

Two new grease-removing compositions patented recently contain butanol and ethanol as essential ingredients. One, which is said to remove carbon deposits as well as grease from metal, plastic, or earthenware parts, contains sodium dichromate and vegetable oils in addition to the alcohols. This mixture may be used cold and without agitation, the inventor claims. The other composition is claimed to remove oil, grease, and metal oxide from metallic surfaces and to deposit a metallic phosphate coating. In addition to ethanol and butanol, this composition is described as containing phosphoric acid and a petroleum solvent.

Aroplaz 1299 Now Available

(*Continued from page one*)

good in leveling properties. Aroplaz 1299 enamels possess a high, sharp gloss which is retained well on long, interior exposure.

For industrial coatings, Aroplaz 1299 is often modified by adding cold cuts of high melting point resins or short oleo resinous varnishes. For exterior coatings the addition of moderate quantities of bodied oils is recommended.

SPECIFICATIONS — AROPLAZ 1299

Solution (75% Solids in M.S.)	Z-Z_1
Acid Number (solvent free basis):	8-12
Color (Gardner Stds. 1933):	8-12
Weight per gallon at 25°C:	7.85-7.95
Oil Content (solvent free basis):	65%
Phthalic anhydride content:	None

Solubility:
Complete in petroleum and coal-tar hydrocarbons; insoluble in ethyl alcohol. Compatible with many oils, resins and alkyds.

Copyright 1946 **This Week** Magazine

Plastics Bibliography

A comprehensive bibliography entitled, "Plastics," comprising over 300 titles dealing with German- and American-developed processes and products, is now available. The bibliography, which covers every phase of the plastics industry from raw materials to uses for finished products, is classified as to contents, such as manufacture, properties, tests, coatings, cementing, protective coatings, fungus resistance, molding, laminating, plasticizers, and uses.

FREE RIBOFLAVIN BOOKLET

"The Use of Riboflavin in Manufactured Feeds" — an authoritative booklet, written from the viewpoint of the feed dealer, *for* the feed dealer is now available. Feed manufacturers interested in arranging for copies for their dealers should write to U. S. Industrial Chemicals, Inc., Special Products Department CN, 60 E. 42nd St., New York 17, N. Y.

New Vitamin B_1 Assay

A new method for the determination of vitamin B_1 consists in oxidizing the thiamine to thiochrome, which is assayed fluorometrically or by titration of the reduction product.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A new paint-mixing machine, designed to fit into any 29-inch square of floor space, is said to introduce a new mixing principle to insure uniform pre-mixing of base colors. **(No. 168)**

USI

New luminous tubing, described as comprising a tough, semi-transparent, moisture- and acid-resistant plastic, uniformly coated with a radioactive material which is said to be clearly and continuously visible at a considerable distance in complete darkness, has been marketed. **(No. 169)**

USI

For surfaces difficult to coat, a new resin derived from petroleum is offered to the paint and varnish industry. It is said to have excellent qualities of adhesion, flexibility, and wetting power. **(No. 170)**

USI

To bond synthetic rubber, a new cement is now available. It is recommended by the manufacturer for bonding Buna-N synthetic rubbers and vinyl films or sheet stocks to rigid surfaces such as steel, aluminum, glass, wood or concrete. **(No. 171)**

USI

New-type stainless steel laboratory filters, claimed to have higher flow rate for any given pore size than any other type of filter, can be heated and cooled without danger of cracking the manufacturer states. **(No. 172)**

USI

To remove synthetic enamel and other coatings, a new stripper, described as a viscous liquid which can be applied by brush or spray as well as dipping, has been announced. It is said to have no harmful action on metals, plastic, or wood. **(No. 173)**

USI

A flaw detector for thin materials can continuously detect and count holes, weak spots, and conducting paths in materials such as paper, sheet rubber, sheet mica, varnished cloth, plastic materials, and enamel films on wire, the manufacturer states. **(No. 174)**

USI

To resist temperatures up to 1200°F., a new non-volatile ceramic-type coating, said to resist rust and acid as well, has been marketed. **(No. 175)**

USI

A self-destroying label, said to remove the danger of anyone removing a label from a genuine product and placing it on substitute merchandise, may be applied to metal, plastic, wood, varnish, glass, or cellophane, and will adhere permanently despite heat, cold or humidity, the maker claims. **(No. 176)**

USI

A new-type wall covering said to be composed of one-inch jewel cut squares of plywood bonded to a fabric backing, can be applied to both flat and curved surfaces with invisible seams, according to the manufacturer. **(No. 177)**

USI

To destroy soot, a new liquid, designed for use on all types of oil and kerosene burners, is said to be harmless to metals or refractory brickwork. **(No. 178)**

U.S.I. INDUSTRIAL CHEMICALS, INC.

60 EAST 42ND ST., NEW YORK 17, N. Y. U.S.I. BRANCHES IN ALL PRINCIPAL CITIES

ALCOHOLS
Amyl Alcohol
Butanol (Normal Butyl Alcohol)
Fusel Oil—Refined

Ethanol (Ethyl Alcohol)
Specially Denatured—all regular and anhydrous formulas
Completely Denatured—all regular and anhydrous formulas
Pure—190 proof, C.P. 96% Absolute
*Super Pyro Anti-freeze
*Solox proprietary Solvent

***ANSOLS**
Ansol M
Ansol PR

ACETIC ESTERS
Amyl Acetate
Butyl Acetate
Ethyl Acetate

OXALIC ESTERS
Dibutyl Oxalate
Diethyl Oxalate

PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate

OTHER ESTERS
*Diatol
Diethyl Carbonate
Ethyl Chloroformate
Ethyl Formate

INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Alpha-acetylbutyrolactone
5-Chloro-2-pentanone
5-Diethylamino-2-pentanone
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Alpha-Oxalpropionate
Ethyl Sodium Oxalacetate
Methyl Cyclopropyl Ketone

ETHERS
Ethyl Ether
Ethyl Ether Absolute—A.C.S.

FEED CONCENTRATES
Riboflavin Concentrates
*Vacatone 40
*Curbay B-G *Curbay Special Liquid

ACETONE
Chemically Pure

RESINS
Ester Gums—all types
Congo Gums—raw, fused & esterified
*Aroplaz—alkyds and allied materials
*Arofene—pure phenolics
*Arochem—modified types
Natural Resins—all standard grades

OTHER PRODUCTS
Collodions
Ethylene Glycol
Nitrocellulose Solutions
Ethylene
Urethan
dl-Methionine

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Printed in U.S.A.

A trademark worth remembering

- Coumarone Resins
- Alkylated Phenol Resins
- Plasticizing Oils
- Coal-Tar Solvents
- Neutral and Shingle Stain Oils
- Rubber Reclaiming Oils
- Chemical Specialties

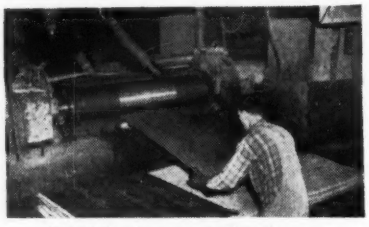
THE NEVILLE COMPANY
PITTSBURGH, 25, PA.
Chemicals for the Nation's Vital Industries

A-23

FOR YOUR INFORMATION

New West Coast Operating Division

The formation in Seattle of a Western Division, provides Monsanto with a larger industrial unit to face continually expanding operations on the Pacific Coast. The new division consists of four plants devoted to the manufacture of plywood glues, paint and wood preservatives. One plant is situated at Los Angeles, while larger plant sites are located at Seattle, where a $2,000,000, 3-year construction program is scheduled. The initial unit in the new construction will be devoted primarily to the manufacture of soybean glues and wood preservatives.



World's Largest Producer of Plywood Adhesives

Original Monsanto facilities for manufacturing raw materials, in combination with the merged Laucks properties on the Pacific Coast, now establish Monsanto as the largest producer of plywood adhesives in the world.

New Pilot Plant for Plastics Research

Construction of a new pilot plant designed for experimenting with production methods for new products has been announced by Monsanto's Springfield office. This added unit will more than double present facilities.

Company officials also stated that the color laboratory will be tripled in size to handle increased requirements due to expanded production of all types of plastics materials. New injection molding equipment will be installed to facilitate sample molding runs.

WHO CAN USE MIXED ISOMERIC TERPHENYLS?

Mixed Isomeric Terphenyls have been used as constituents in marine coating materials and as components in special high-temperature lubricants. Since other commercial uses can undoubtedly be found, the following physical, chemical and electrical properties are included to assist you in developing new applications:

PHYSICAL PROPERTIES

Density @ 25° C.—g./cc.	1.133
Color — NPA	4–5

MELTING POINT

Mixed Isomeric Terphenyl does not have a sharp melting point.

Begins to soften	60° C. (140° F.)
Completely liquid	145° C. (289° F.)

SOLIDIFICATION TEMPERATURE

Upper hold point	137–147° C. (278–289° F.)
Lower hold point	45– 60° C. (113–140° F.)
Distillation Range D-20 modified	364–418° C. (687–784° F.)
Flash point	191° C. (375° F.)
Flame point	238° C. (460° F.)

ELECTRICAL PROPERTIES

Dielectric Constant	2.58
Resistivity — ohm/cm³ @ 100 °C.	140,000 x 10^9
135° C.	35,000 x 10^9
155° C.	550 x 10^9

SOLUBILITY

SOLVENT	Grams Mixed Isomeric Terphenyl per 100 ml. of solvent	
	25° C.	75° C.
3A Alcohol	0.008	0.6
Turpentine	1.2	9.0
Fuel Oil, API 36° SUS 100° F.—38	1.66	8.4
Benzene	6.0	42.0
Trichlor Benzene	9.0	45.0
Stoddard's Solvent	0.7	8.0
Nitromethane	0.2	7.5
Nitroethane	2.0	15.0
1–Nitropropane	2.0	20.0
2–Nitropropane	2.0	20.0

For further technical information write for Bulletin P-105. MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 So. Second St., St. Louis 4, Mo.

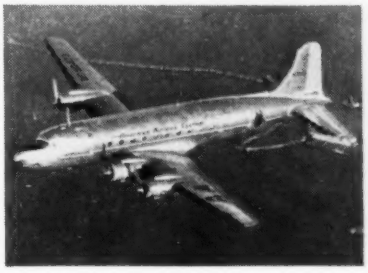
TO SIMPLIFY YOUR CHOICE OF PLASTICIZERS

You will find a preliminary basis for the selection of Monsanto Plasticizers in the cross-reference table included here. Obviously this is only indicative of possible applications — Monsanto's 60-page book "Plasticizers and Resins" contains extensive information on moisture resistance, flexibility, adhesion, hardness, softening effects, permanence, fire retardence, film strength, brilliance, gloss, and other desirable properties contributed by Monsanto Plasticizers. Send for your copy. Also contact Monsanto for specific information concerning your present or prospective needs. Write:

MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Mo.

● Denotes: of use
▮ Denotes: of special value

	Aroclors	Dibutyl Phthalate	Diethyl Phthalate	Dimethyl Phthalate	HB-40	Ortho-Nitrobiphenyl	Santicizer 3	Santicizer 8	Santicizer 9	Santicizer 10	Santicizer 8-16	Santicizer E-15	Santicizer M-17	Santicizer 140	Santicizer 160	Triphenyl Phosphate	Tricresyl Phosphate
Acrylates			▮									▮	●	●		▮		
Alkyds		▮	▮									●	●	▮				▮
Benzyl Cellulose		●				●						▮	▮					
Buna N		▮	▮				●					●	▮	▮	●			▮
Cellulose Acetate				▮	▮		▮	●	●		●		▮	▮	●		▮	
Cellulose Acetobutyrate		▮	●				●	●	●			●	●	●	●	●	●	●
Cellulose Acetopropionate		▮	▮	●	●		●	●	●		▮	▮	●	●	●	●	▮	▮
Cellulose Nitrate		●	▮				▮	▮	▮	▮	●	▮	▮	▮	●	▮		▮
Chlorinated Rubber		▮	●				●					●	●	●				●
Ethyl Cellulose		●	●	▮		▮	▮	●	●		▮	●	●	●	●	▮	▮	●
Melamine-Formaldehyde										▮		▮						
Phenol-Formaldehyde										▮				●				●
Polyamide								●	▮	▮					●			
Polyvinyl Acetate		●	●				●	▮	▮	▮	▮	●	●	●		●	▮	●
Polyvinyl Butyral		▮	●				●						▮	▮	●	▮		
Polyvinyl Chloride		●	●			●	●						●	●	▮	▮	▮	▮
Polyvinyl Chloride-Acetate		●	▮			●	●						●	●	▮	▮	▮	▮
Polyvinyl Formal				▮			●	▮	●		▮		●	●			▮	▮
Polystyrene		●	●			●	●	▮	▮		●	▮	▮	▮	▮	▮	▮	●
Santolites		▮	●	▮			▮	●	●	▮	▮	●	●	●	●			▮
Shellac			▮	▮			▮	●	●	▮		●	▮	▮				
Urea-Formaldehyde								●	●	▮		●						
Zein								●	●	▮								



SKYLAC Flame-Resistant Fabric Finish

Monsanto's Merrimac Division at Boston has begun volume production of Skylac — a flame-resistant fabric finish for both exterior and interior surfaces of aircraft. Skylac was initially developed for the armed forces.

This improved finish affords an additional safeguard since its burning rate is about one-fourth that of conventional finishes. It ignites more slowly and, unless heat is applied from without, the flame tends to snuff out. It has the same tauting effect as present finishes but can be applied with far less effort. Skylac also contains a fungicide which protects fabric from deterioration due to mildew.

Another Plastics Sales Office

To further extend its service to molders, Monsanto Plastics Division recently located a sales office in Cincinnati, with Edward T. McBride as Branch Manager.

Expanded Production of Wood Flour

Monsanto's Plastics Division has just announced plans for construction of a new plant for the production of wood flour, key ingredient of phenolic-type plastics sold under the trade name Resinox. Among other things, these added facilities will permit an exacting control over product quality.

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CHEMICALS AND PLASTICS
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MONSANTO CHEMICAL COMPANY, 1700 South Second St., St. Louis 4, Missouri . . . District Offices: New York, Chicago, Boston, Detroit, Cleveland, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle. In Canada, Monsanto Ltd., Montreal, Toronto, Vancouver. *Reg. U. S. Pat. Off.

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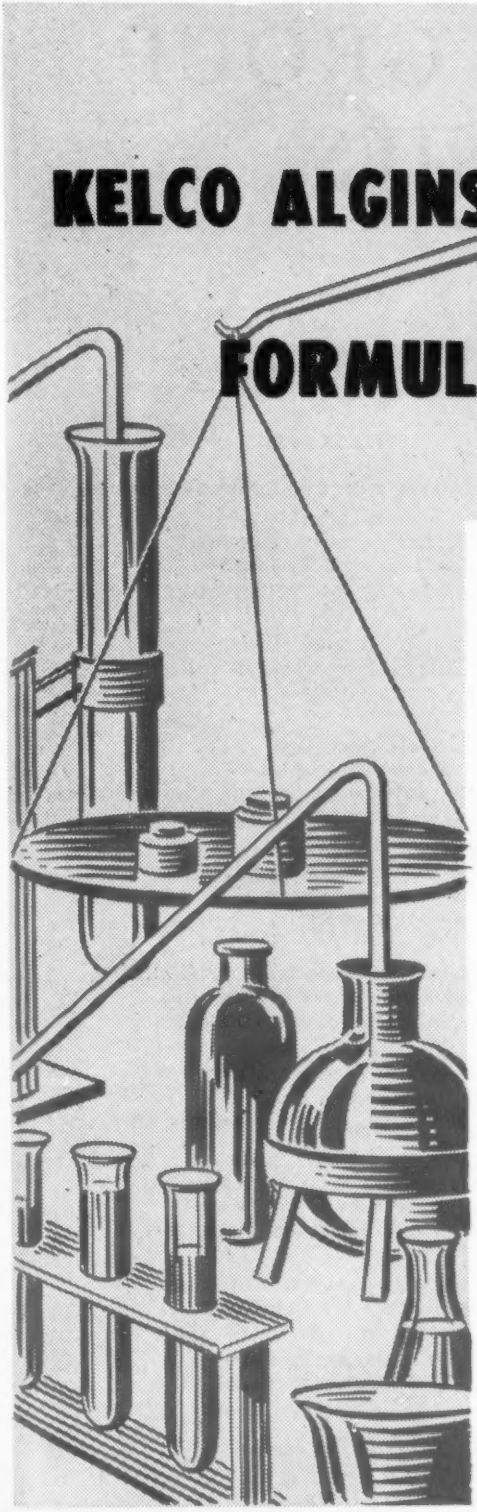

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Free of extraneous olefins . . . and containing tertiary double bonds only . . . this controlled-quality intermediate is available for immediate shipment in drum or tank car quantities

SPECIFICATIONS	
Distillation range	100°-103° C
Acidity	Less than .004% by weight (as H_2SO_4)
Color	Water white
Odor	Sweet

REACTIONS:

ALKYLATION: Both isomers yield identical alkylation products

HYDROGENATION, CHLORINATION, BROMINATION

ADDITION OF HCl, HBr, HI—H_2SO_4—HNO_3—HOCl, HOBr—O_3—N_2O_3—NO_2—NOCl—S_2Cl_2—SCl_2—H_2O_2, etc.

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Synthetic detergents **Phenolic resins**

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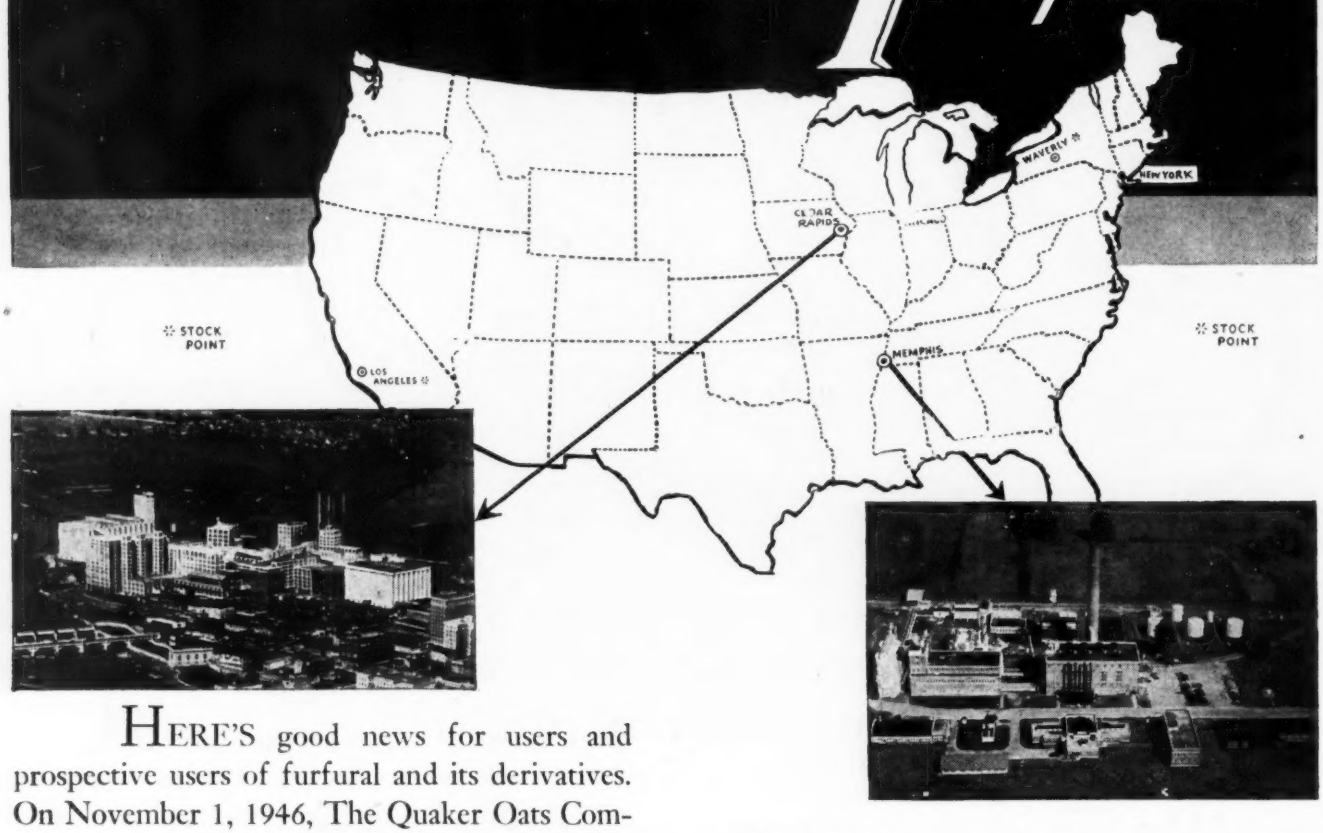
From Tennessee and Iowa TWO PLANTS NOW SUPPLYING *Furfural*



HERE'S good news for users and prospective users of furfural and its derivatives. On November 1, 1946, The Quaker Oats Company purchased the furfural manufacturing plant at Memphis, Tenn., formerly owned by the government. This plant, operated for the government during the war by The Q. O. Chemical Company, a wholly owned subsidiary of The Quaker Oats Company, supplied all the furfural requirements for the government's vast synthetic rubber program. Now, this same personnel continues under the new ownership to run this plant, government needs being supplied from here as before.

TWO SOURCES FOR INDUSTRIAL USERS

Excess capacity from the Memphis plant, the largest furfural producer in the world, as well as the entire facilities at the Cedar Rapids plant, are now available to industrial users of furfural and its derivatives. With these two sources, widely separated geographically, users of furfural are further assured of an uninterrupted flow of furfural in ample volume to meet their needs.

FURFURAL'S VERSATILITY WARRANTS YOUR INVESTIGATION

This versatile aldehyde, the cheapest pure aldehyde available today, is rapidly growing in importance in a wide variety of applications. If you are not entirely familiar with its current uses and reactions, we suggest you write on your letterhead for literature we have available.

The Quaker Oats Company — **CHEMICALS DEPT.**

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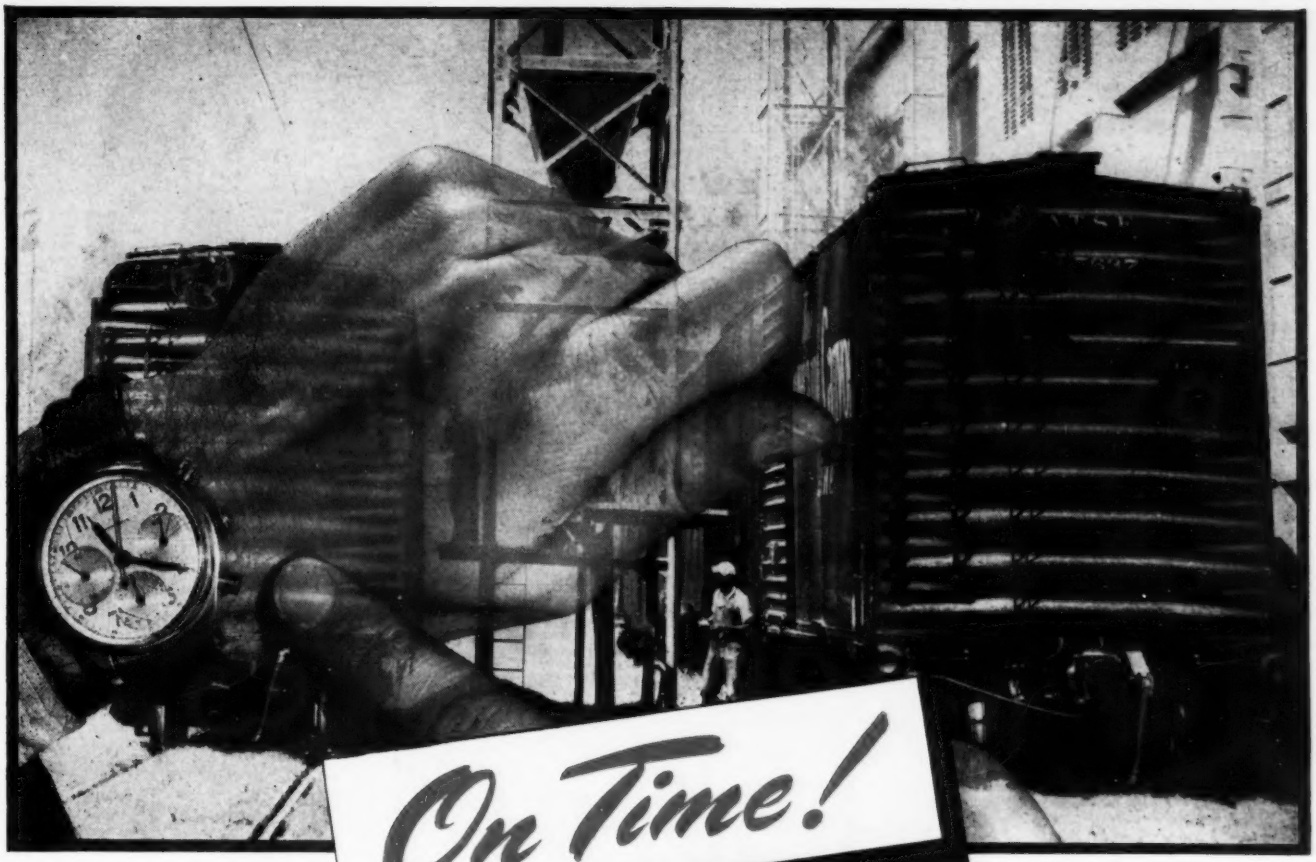

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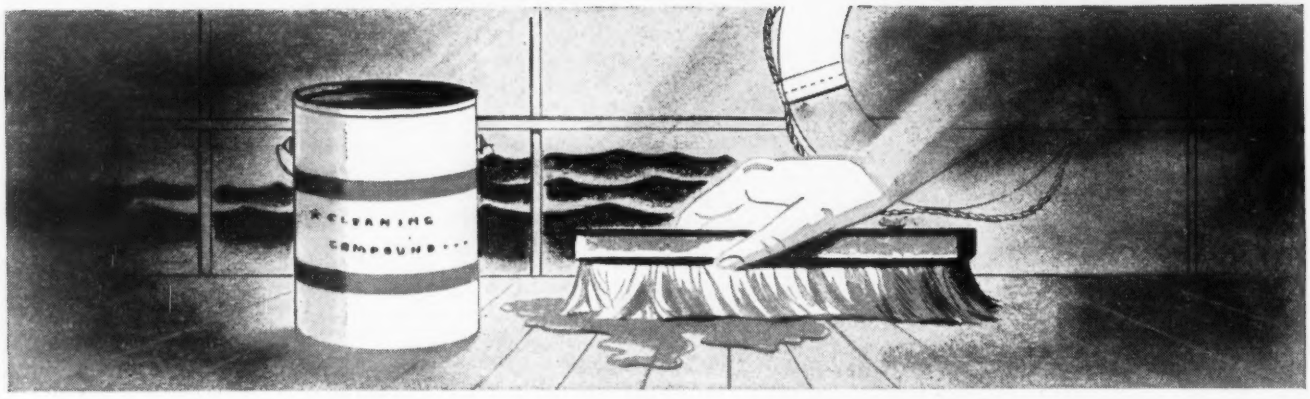

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Surfaces coated with spars, enamels or varnishes based on No. 1001 and No. 1003 Super-Beckacites can take anything—from cleaning compounds to pounding wear. Special RCI methods make these pure phenolic resins sure sources of the super-qualities essential for marine and outdoor use. Waterproof, chemicalproof and wearproof, they are the backbone of the finest products. Back your reputation with the best—standardize on No. 1001 and No. 1003 Super-Beckacites. The only difference is in color —X or lighter for No. 1001—F-E for No. 1003. For formulating facts write the Sales Department at Detroit.

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Modern, high-quality equipment designed for daily production of 140 tons ACETIC ACID and 720 tons ACETIC ANHYDRIDE

This facility, identified as "Plant A" of the Holston Ordnance Works is located about one mile south of downtown Kingsport, fronting on the South Fork Holston River and adjacent to U. S. Highway No. 81. It consists of approximately 94 acres with various manufacturing and processing buildings aggregating a total floor area of approximately 540,000 sq. ft.

The principal buildings are: Acid Concentrator, 46,000 sq. ft.; Acid Making, 8 floors, 25,000 sq. ft.; Catalyst, 3,800 sq. ft.; Two Anhydride Making, one of 92,000 sq. ft. and the other 49,000 sq. ft.; Anhydride Refining, 8 floors, 55,000 sq. ft.; Steam Plant, 55,300 sq. ft.; and Refrigeration Plant, 13,000 sq. ft. Remainder of buildings include: Office, Laboratory, Storage, Pump House, Maintenance, etc. Plant is completely equipped for the manufacture of the chemicals mentioned above. Included are such items of production equipment as: catalyst units, preheaters, condensers, coolers, exchangers, vacuum jets, desuperheaters, refrigeration units, boilers, furnaces, decanters and overflows, coal and ash-handling systems, aluminum and wood tanks, etc.

GOVERNMENT OWNED SURPLUS PLANTS

***NOTE:** The Processes and Much of the Equipment Are Subject to Private Patent Rights*

Also included in this offering, for use in place, are: lead-in electrical transmission line, substation, transformers, switch frame, process steam boiler plant (coal-fired), capacity 970,000 lbs. per hr. at 400 psi and 575 degrees.

Data herein are necessarily abbreviated and are not intended for use as a basis for negotiation.

Final written proposals for the purchase or lease of "Plant A—Holston Ordnance Works" in its entirety, or any portion thereof, will be received by the War Assets Administration, Office of Real Property Disposal, P. O. Box 1172, Nashville, Tennessee, until 11:00 A.M., C.S.T., Monday, March 31, 1947, at which time all proposals will be publicly opened and read. Information on how to prepare and submit a proposal may be obtained from any War Assets Administration Regional Office.

CREDIT TERMS may be arranged.

War Assets Administration reserves the right to reject any or all proposals. For complete details address:

WAR ASSETS ADMINISTRATION

OFFICE OF REAL PROPERTY DISPOSAL

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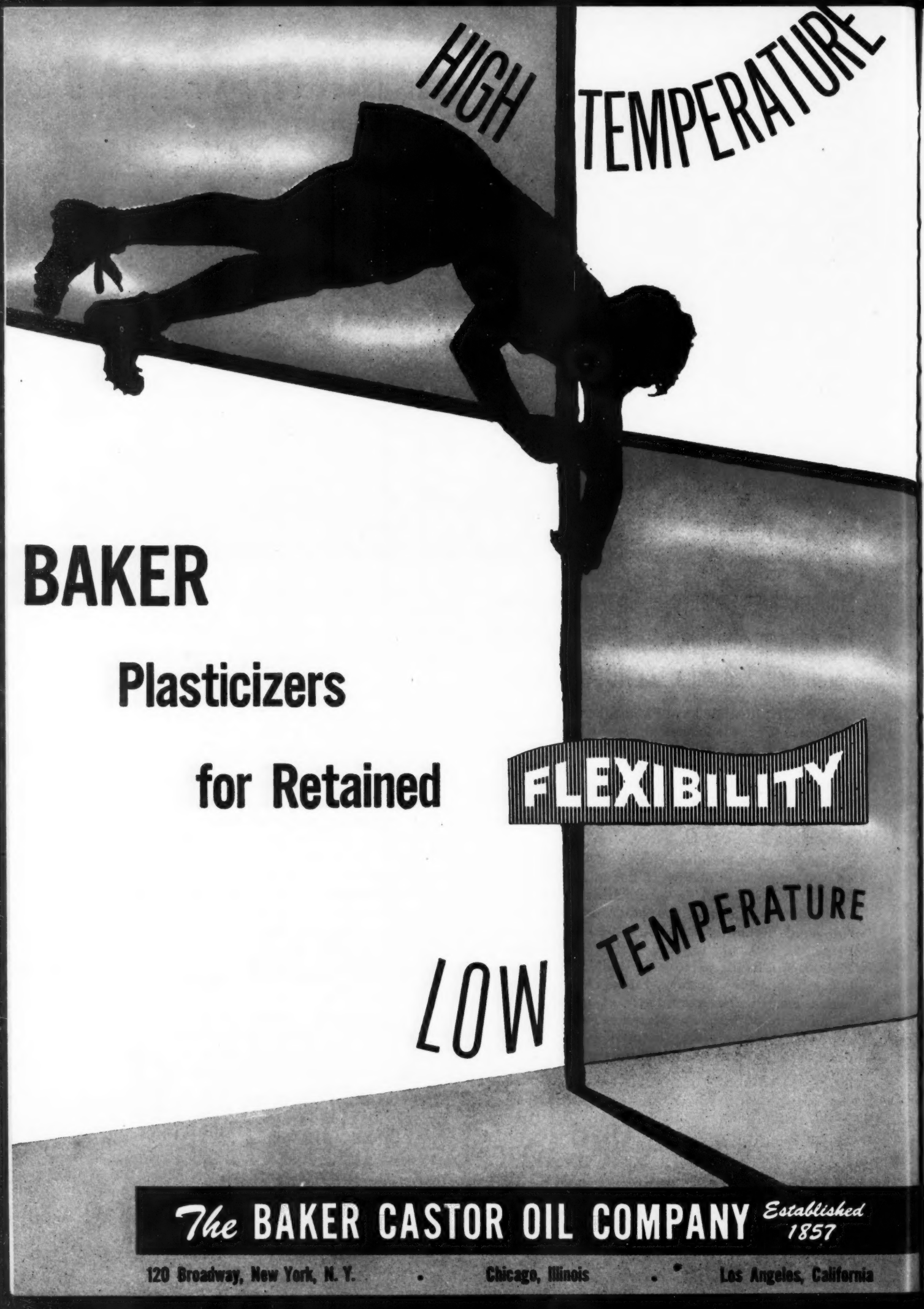
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an official U.S.P. Antimalarial

All Government controls covering the use and sale of Totaquine, Cinchonidine, and Cinchonine have been cancelled.

Totaquine Merck U.S.P. XII is a greatly improved product—a white to slightly yellow fine powder, practically free from Quinoidine, and fully meeting all specifications. Totaquine Merck is an effective and low-cost antimalarial.

Ample stocks of Totaquine U.S.P., Cinchonidine Alkaloid, and Cinchonine Alkaloid are available for prompt shipment upon receipt of your order.

Information on the compounding of Totaquine is available on request.

Write to Technical Sales Service, Merck & Co., Inc., Rahway, New Jersey

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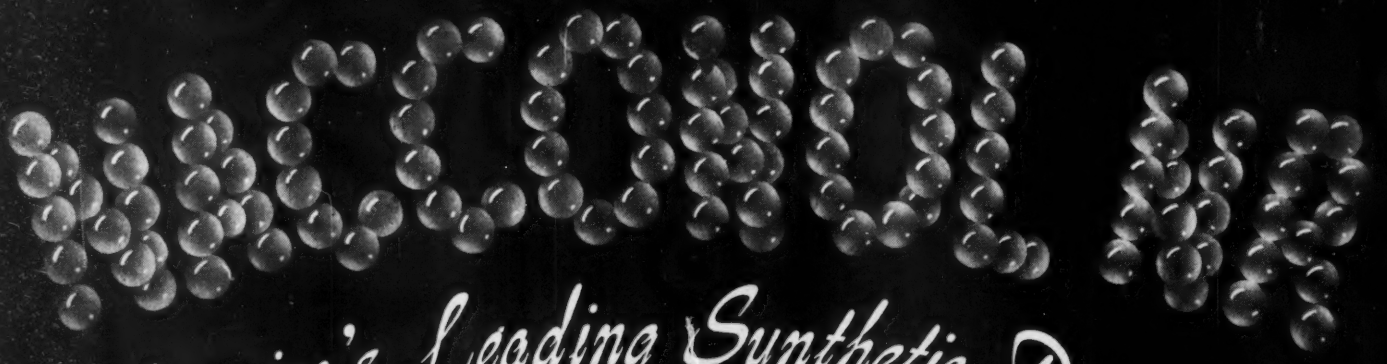
MERCK MERCK MERCK MERCK



America's Leading Synthetic Detergent

Stable in Performance

NACCONOL NR functions efficiently in acid or alkaline, hot or cold solutions. Can be used in hard water or with metal salts, with oxidizing agents or reducing agents. Combines washing, wetting, emulsifying, dispersing and foaming in one *economical* synthetic detergent.

Stable in Price

We repeat: *"No increase in* NACCONOL NR *price."* Today NACCONOL NR costs only one-third as much as when introduced fifteen years ago. Our policy will always be to pass along lower prices resulting from greater production and better technology.

New plants are being constructed. More NACCONOL NR available later this year.

National Aniline is America's oldest and largest producer of synthetic organic detergents. National Aniline developed America's first stable synthetic organic detergent NACCONOL NR, today the most widely used. Our unmatched technical experience in this field and unequalled production facilities are at your service.

National Aniline

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"If *anything* can solve your problem it's Nuchar Activated Carbon"

Why not take advantage of the Nuchar Research Laboratory technical service? Nuchar Technicians will study your individual purification problems and tell you definitely whether Nuchar Activated Carbon is the answer.

Studies are frequently made for the purpose of furnishing prospective users of Nuchar with that quality which will best serve their individual needs on the basis of efficiency and economy. In evaluating the use of Nuchar Activated Carbon for a process, the Nuchar Technician first determines the maximum product improvement that can be obtained. This is arrived at by using an excessive dosage of Nuchar.

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Over 25 years of specialization in purification by adsorption, give Nuchar Technicians a wealth of experience to put to work on your problems. Write today for complete information and a generous sample of Nuchar—"The Modern Purifier."

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Southwestward, Ho!

by ROBERT L. TAYLOR, editor

LOOK SOUTHWESTWARD IF YOU WOULD SEE what appears to be the coming number one producing center of the chemical industry in the United States.

The Gulf Coast lands of Texas and Louisiana now bristle with rectifying columns that send forth some millions of pounds a day of alcohols, aldehydes, ketones, glycols and half a hundred other derivatives of the petroleum and natural gas with which nature has endowed this area so bountifully.

Sulfuric acid absorbers dot the landscapes of half a score of cities in Texas, Oklahoma, Arkansas and Louisiana, while seven chlorine and caustic plants are strung along the Gulf Coast from Corpus Christi to Baton Rouge.

The great Dow magnesium-from-seawater project at Freeport, Texas; the government-built ammonia plants in Louisiana, Texas and Arkansas; and the tremendous synthetic rubber and plastic developments at Port Neches, Texas City, Borger and Orange, Texas, combine to fill out the picture of a lusty Southwest industry of chemical staples that has come into being almost wholly in the past thirteen years, an industry in which has been poured the astounding sum of $1,300,000,000 in new capital just since 1941.

The chemical boom in the Southwest is the subject of a ten-page report in this issue of CHEMICAL INDUSTRIES. The editors have spent many hours talking to people in both New York and the Southwest to give you as complete and factual an account as possible of the strides that have been made and are still being made in this area.

Intentionally our report sticks close to the subject of chemicals. As anyone who has been in the area recently will tell you, however, it would be a serious mistake to assume from this that the boom in the Southwest is confined to this industry alone. It is considerably more far-reaching than that.

The Southwest over the past five years has been experiencing a major industrial upsurge of broad proportions. Basically the area is one which is uniquely blessed with a combination of characteristics attractive to industry. It has an even, mild climate; abundant supplies of cheap fuel; most of the important agricultural, mineral and forest raw materials; a coast line that offers several excellent harbors for both coastwise and intercontinental shipping; and a labor record which thus far has been outstandingly good.

When added to this natural setting, the locating of a number of large war plants in the Southwest turned out to have a pump-priming effect. Influx of new industry since V-J Day has proceeded apace at a rate very little diminished from that of the war years.

The Fort Worth-Dallas metropolitan area, for example, which has not figured in the chemical picture except perhaps indirectly, has mushroomed from a population of 600,000 in 1940 to approximately 750,000 by the end of the war and an estimated 840,000 today. Where two large aircraft plants accounted for most of the wartime increase, a hoard of new industries have come into these two cities in the past eighteen months to take up well over twice the slack created by war-end aviation cutbacks. And the new companies have represented substantial, basic industries, such as rubber fabrication, soap, building materials, glass, farm machinery, auto parts, and automatic machinery.

It is altogether likely, too, that the movement of markets and populations in the United States has had something to do with the flowering of the Southwest at this particular time in the nation's history. It is well known that the center of U. S. population has been moving steadily westward since the earliest days. Following a simultaneous northward drift for a number of years following the Civil War, the path of that mythical point began to swing south again about 1920. Latest studies indicate that it is now at a location on the southern Illinois-Indiana border about equi-distant from New York and Fort Worth.

Although it has seemed impractical to extend our report in CHEMICAL INDUSTRIES to include these broader aspects of the Southwest development, it is important that readers keep them in mind in considering the chemical part of the picture. They put an additional significance on something which on the surface may simply seem to be a logical offshoot of the oil industry and progress in aliphatic chemistry. The chemical boom in the Southwest fits coincidentally into a basic migration pattern of U. S. industry and people.

Needed: Facts and Figures

No business can successfully plan the marketing and distribution of its products unless it has facts available—and there are few compilations of basic market information as valuable as the census of manufactures.

Yet not since 1939 has a business census been taken. And with the current Washington emphasis on economy, there is danger that an aqequate allocation of funds may not be forthcoming from the present Congress.

When the last census was taken, in 1939, it cost some $3.5 million. Last year the 79th Congress failed to pass enabling legislation required to take a census in 1946, an off year (the standing law provides for a census in odd years only). Present indications are that budgetary paring may reduce the estimated $5 million needed to do the job this year to a meagre $2.5 million, which is about 30% less than the actual cost of the job in 1939.

The necessity of allocating sufficient funds for a complete and accurate statistics-gathering job in 1947 cannot be over-emphasized. Chemical companies can, and should, take constructive action by drafting statements and forwarding them to their congressmen.—WAJ.

Chase Out the Kitty

In his discussion of "man-made hiding places" for yield losses ("Plant Yield Studies Cut Losses," page 408 this issue), author Schlaudecker touches on a sore point. We refer to the practice of deliberately distorting figures in plant production reports.

While we don't want to imply that such practices are the general rule, they are sufficiently widespread and of such a serious consequence as to deserve constructive attention.

The ultimate refinement in tinkering with yield reports is found in the venerable business of keeping a "kitty." Now the "kitty" is normally mentioned only in the closest operating circles, and then only in hushed tones. It is a simple thing—merely a little private inventory tab. If this week's or month's performance is a little better than normal, the "kitty" gets a credit bonus, and the yield and inventory reports are adjusted to show a more normal figure. Later, when the performance is subnormal, the "kitty" gives its hoarded inventory back to the "records", and the official yield figures hold a calm and steady course.

Now lest some would incriminate the poor production man for malpractice, let it be said that he is only partly to blame, if at all. Chances are that he inherited the "kitty" system. Even if he didn't, it is often fostered by certain attitudes up the line.

Two factors particularly foster the "kitty"—the accounting mind and the hard-boiled boss. The accounting mind insists that each month's and week's performance must be exactly the same as every other, regardless of any changes in conditions, and that both sides of the ledger must balance with nothing unaccounted for. The hard-boiled management refuses to approve much-needed changes in equipment and processing—changes that would minimize variations and obviate certain recurring difficulties.

Under the constant influence of these attitudes from above, the production man often despairs of ever making any real improvements. In a peaceful desire to keep out of hot water he resorts to the "kitty". He gives those at the top the nice figures they want—and, he makes no more improvement suggestions. After all, it is a very human tendency to try to please the boss.

If you want your plant operation to look nice on paper, the "kitty" is about the easiest way to do it. But, if you want a steady, forward movement toward lower costs and more production, then chase out the "kitty." The way to start is to let those down the line know that your attitude is sympathetic to plant production problems and open to suggestion for permanent improvements.—RHB.

Progress in Radiological Study

As important as the engineering problems in the development of atomic energy is the necessity for more information on the nature, treatment and prevention of the effects of radioactivity on the human body.

That progress is being made in this direction is indicated by the report that a partially effective treatment for plutonium poisoning is now being tested at the Argonne National Laboratory. It has been found that the administration of zirconium to rats results in a fifteen-fold increase in the amount of plutonium passed in the urine over a twenty-four hour period.

This is only one of the many problems that must be solved before atomic power can be used with other than the most elaborate precautions to protect the workers. It is significant that work along these lines appears to be meeting with success.—HWZ.

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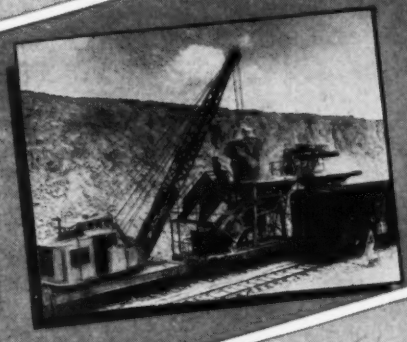

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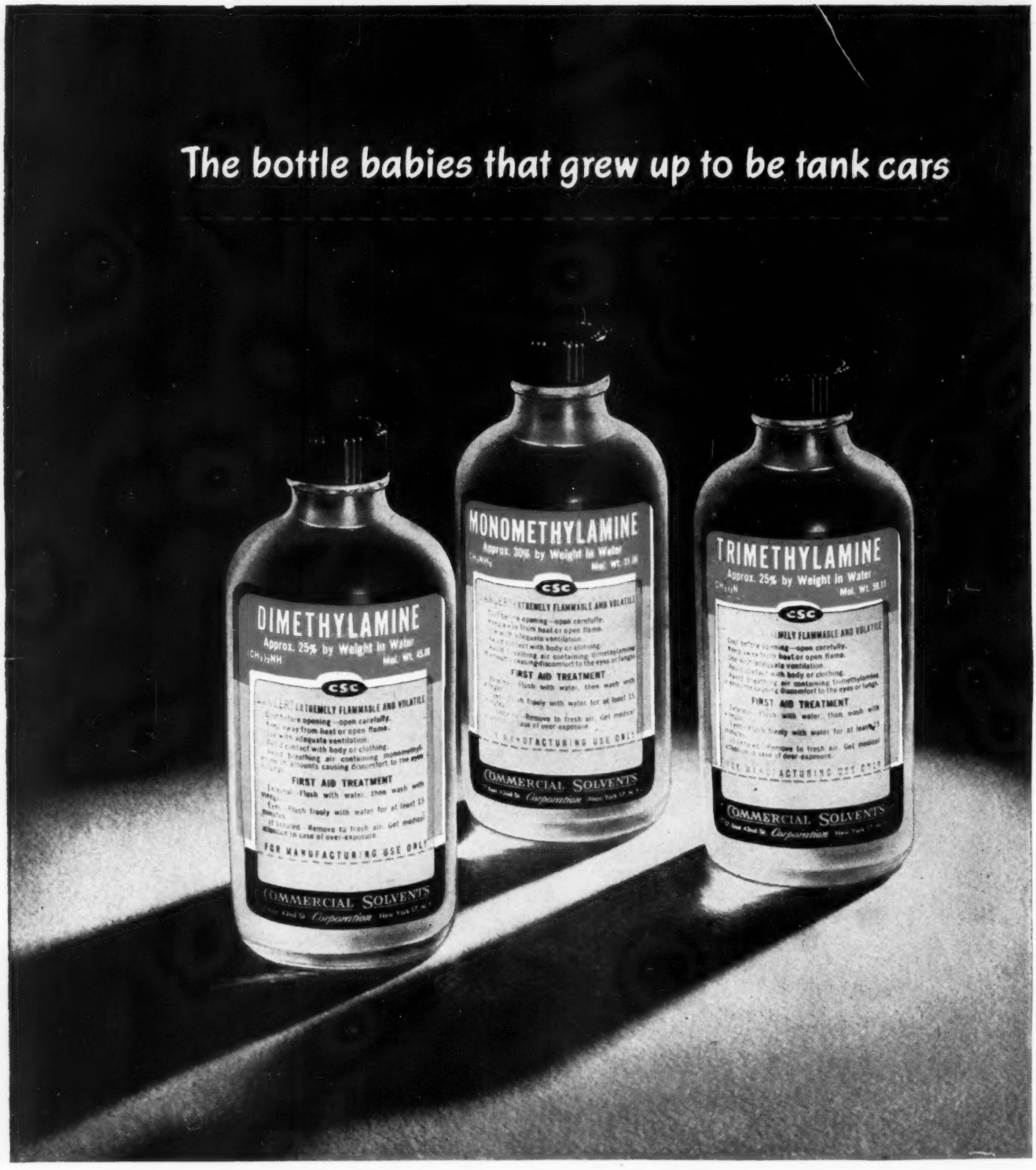

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MARCH, 1947

BOOM in THE SOUTHWEST

Sulfur and Salt Meet Oil and Tidewater In the Country's Fastest-Growing Chemical Area

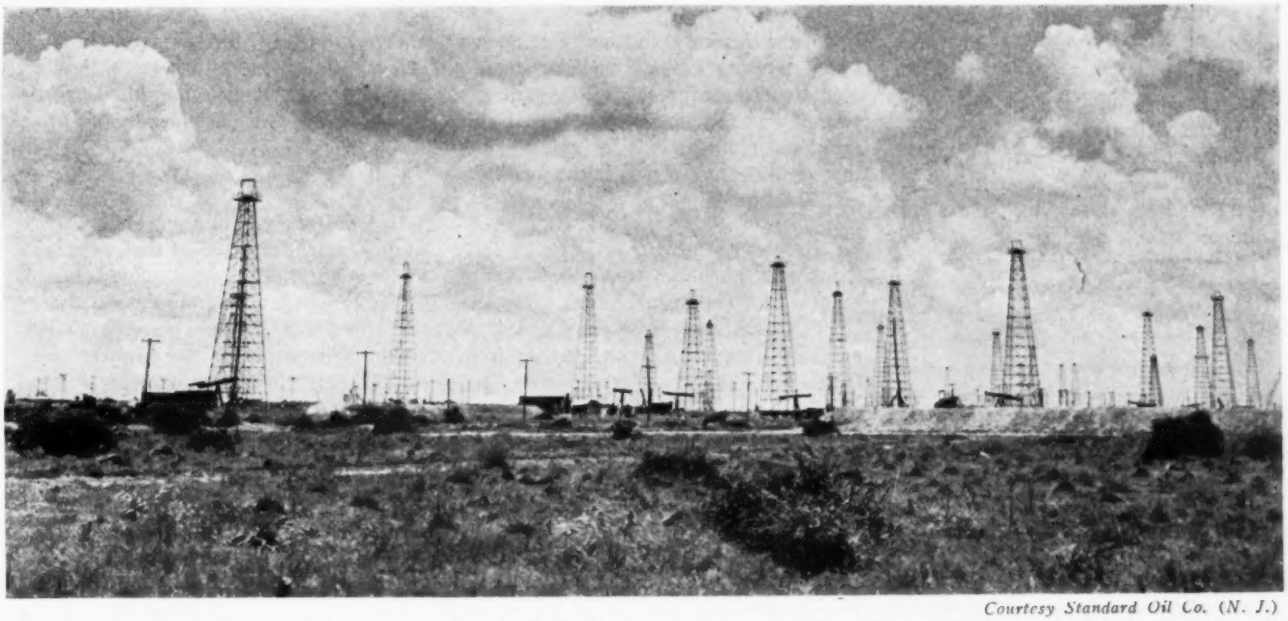
EDITORIAL STAFF REPORT

AN ABUNDANCE OF RAW MATERIALS and low cost fuel have made the Southwest a "natural" for chemical manufacture. But important as they are, they cannot wholly account for the tremendous postwar expansion of this area. The key is found, rather, in growing demand for synthetic aliphatics, coupled with new processes based on hydrocarbons.

THE FASTEST growing chemical area in the country today is the Southwest. This section, comprising the states of Texas, Louisiana, Arkansas and Oklahoma—far from Eastern markets though it is—enjoys a wealth of natural advantages which has contributed to its growth. Since V-J Day it has welcomed a $300,000,000 commitment in private chemical capital—this on top of the $1,000,000,000 invested under the stimulus of war.

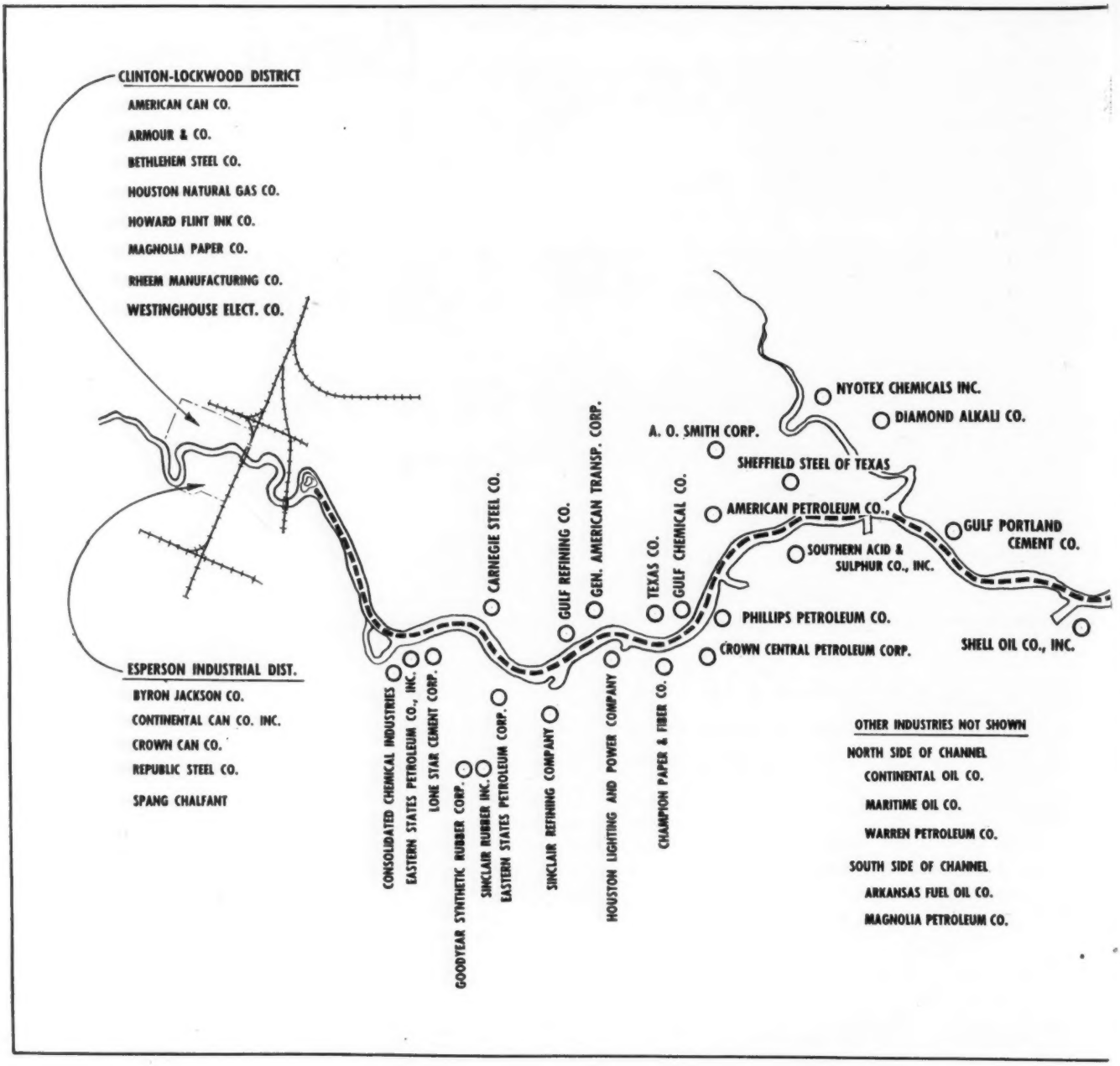
Significantly, this new private capital is coming in at the same time as industry's absorption, either by direct purchase or long term lease, of many of those facilities constructed in this area during the war by the federal government. Of even greater long-term importance, perhaps, is that this is the first time any other section of the country has so boldly challenged the traditional dominance of the Eastern seaboard, since Colonial days the center of American chemical activity.

One doesn't have to look far to find reasons for the Southwest's emerging stature: More than anywhere else in this country—perhaps, indeed, in the whole world—almost illimitable resources of key chemical raw materials (salt, sulfur, carbon, hydrogen and lime) are combined with low power costs and tidewater shipping. In addition, the benign climate plays its part in cutting down plant investment by permitting maximum use of out-of-doors construction.



Courtesy Standard Oil Co. (N. J.)

The Pierce Junction field is one of the many providing the flood of hydrocarbon raw material on which the Southwest chemical industry is based.



HYDROCARBONS

In the main, however, it has been the bounteous supply of very cheap hydrocarbons that has tilted the scale in favor of this area. Cheap hydrocarbons are a double-edged advantage: First, they provide the skeleton upon which the architecture of organic products is contrived. Second, they are the source of the heat needed to produce low-cost steam and electrical power, which in turn are required to reorganize the hydrocarbon structure into the many chemicals now manufactured in tonnage quantities.

The Southwest has long been the largest producer of petroleum and natural gas, but not until the opening of the East Texas field in 1930 were the potentialities of this region fully apprehended. The Southwest has recently been accounting for a full 60 per cent of domestic crude petroleum production and over 71 per cent of the natural gas. The latter figure is calculated before deducting the amount of gas returned to the ground for storage. Add to this the proved reserves in this section—making up 75 per cent of the country's total—and it is evident that there is little reason to fear the pipe lines will soon be empty.

SALT

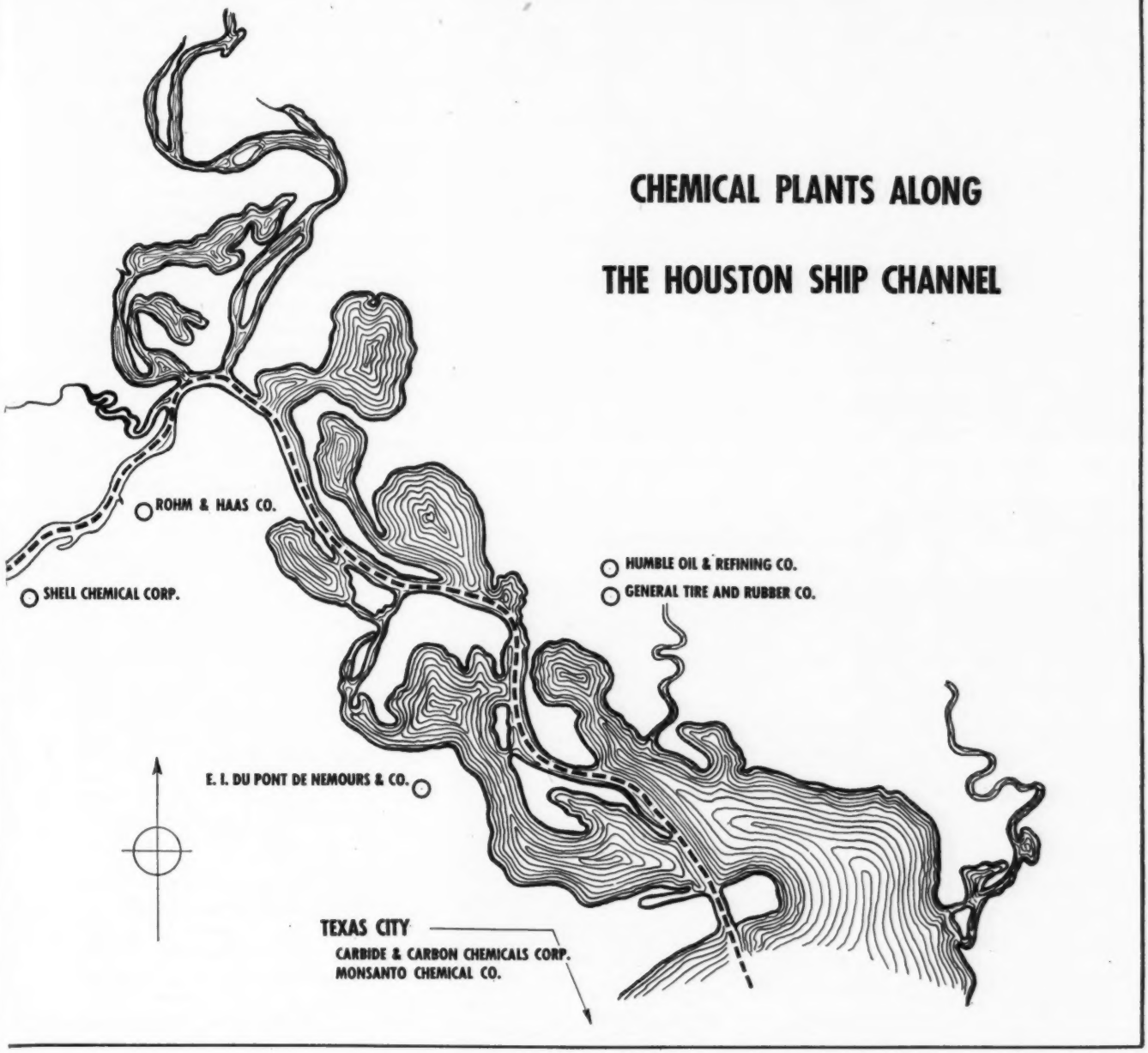
Inorganic chemicals, too, abound in the Southwest. The supply of salt, for example, is well-nigh inexhaustible, and 20 per cent of our production comes from this region. It occurs both as brines and rock salt deposits, the large beds in Louisiana forming one of the largest caches of this type in the entire world. Ten producing properties in this locality are listed in Table I.

SULFUR

In 1903 the first shipment of Louisiana sulfur, amounting to 3,000 tons, was sent to New York. Today the sulfur obtained by the Frasch process from the salt domes of Louisiana and Texas provides all but a negligible portion of the elemental sulfur consumed in this country as well as

TABLE I
SOUTHWEST SALT PRODUCERS

Company	Location	Parish or County
Carey Salt Co.	Winnfield, La.	Winn
Dow Chem. Co.	Bryan Mound, Texas	Brazoria
International Salt Co.	Avery Island, La.	Iberia
Jefferson Island Salt Co.	Jefferson Island, La.	Iberia
Mathieson Alkali Works	Weeks Island, La.	Cameron
Miles Salt Co.	West Hackberry, La.	Iberia
Morton Salt Co.	Grand Saline, Texas	Van Zandt
Solvay Process Co.	Bayou Ccoctau, La.	Iberia
Southern Alkali Corp.	Palangana, Texas	Duval
United Salt Co.	Hockley, Texas	Harris


CHEMICAL PLANTS ALONG
THE HOUSTON SHIP CHANNEL
ROHM & HAAS CO.
SHELL CHEMICAL CORP.
HUMBLE OIL & REFINING CO.
GENERAL TIRE AND RUBBER CO.
E. I. DU PONT DE NEMOURS & CO.
TEXAS CITY
CARBIDE & CARBON CHEMICALS CORP.
MONSANTO CHEMICAL CO.

supplying a large part of the world market. The Southwest properties, listed in Table IV, brought over 4,500,000 short tons out of the ground in 1946. Besides supplying the export demands, they furnished some 79 per cent of the element used to manufacture sulfuric acid. Only about 70 per cent of the sulfuric acid manufactured before the war was made from elemental sulfur.

FOUR PERIODS OF PROGRESS

The industrial history of this area can be divided into four distinct and quite sharply defined eras: the early days when its chemical industry was small and inchoate the period between the establishment (in the mid-30's) of alkali plants at Corpus Christi, Texas, and at Lake Charles and Baton Rouge, Lauisiana, and the beginning of the war; the war production boom; and, finally, the vast increase after the war.

NOTHING AT FIRST

Before discovery of the great oil and gas fields in East Texas and inception of the alkali industry, chemical manufacture in this area was confined to a few scattered locations. An example is the Cities Service Refining Co. plant at Tallant, Oklahoma, which oxidizes natural gas hydrocarbons to a mixture of methanol, formaldehyde, acetone and acetaldehyde. Also ethanol was made from sugar cane molasses by Commercial Solvents Corp. at Harvey and Westwego, La.

Cities Service was piping gas to Chicago and having difficulty with pipe-line corrosion. This was thought to be due to oxygen contained in the gas. The suggested solution was to pass the mixture over a catalyst, to remove the offending oxygen by promoting oxidation.

An appreciable quantity of formaldehyde was found in the offgas of this reaction, thus inviting its development as a workable process for making formaldehyde. This eventually led to the establishment of the plant at Tallant, which, in common with other plants in this area, is now reported to be expanding.

TABLE II
SOUTHWEST SULPHUR PRODUCERS

Company	Dome	County or Parish
Duval Texas Sulphur Co.	Orchard Dome, Texas	Fort Bend
Freeport Sulphur Co.	Grand Ecaille, La.	Plaquemines
Freeport Sulphur Co.	Hookins Mound, Texas	Brazoria
Jefferson Lake Sulphur Co.	Clemens Dome, Texas	Brazoria
Jefferson Lake Sulphur Co.	Long Point, Texas	Fort Bend
Texas Gulf Sulphur Co.	Bolling Dome, Texas	Fort Bend

It was not until 1925, however, that the aliphatic chemical industry, which accounts for a major share of today's activity, emerged into full bloom. That year marked the initiation, by Carbide and Carbon Chemicals Corporation at South Charleston, West Virginia, of the successful use of natural gas hydrocarbons to produce a wide variety of aliphatic chemicals.

THEN CAME ALKALI

The incursions of the first era can best be described as forays. Not until the fall of 1934, when Southern Alkali Corporation completed a plant at Corpus Christi, Texas, did the chemical industry mobilize for its first large-scale invasion of the Southwest. This company, a subsidiary of Pittsburgh Plate Glass Company and American Cyanamid Company, was soon followed southward by Mathieson Alkali Works and Solvay Process Company, who completed plants at Lake Charles and Baton Rouge, respectively, in the spring and summer of 1935.

The advantages at Southern Alkali for caustic made by the ammonia-soda process are obvious. All of the essential raw materials are near at hand: lime from the extensive oyster shell deposits in Nueces Bay; salt from the company wells 60 miles away, piped by gravity flow; abundant gas and oil for fuel in the immediate vicinity. Coke is the only material which had to be shipped in. Ample transportation facilities are another advantage: in addition to the railroads, the Gulf provides water shipping for both coastwise and export trade.

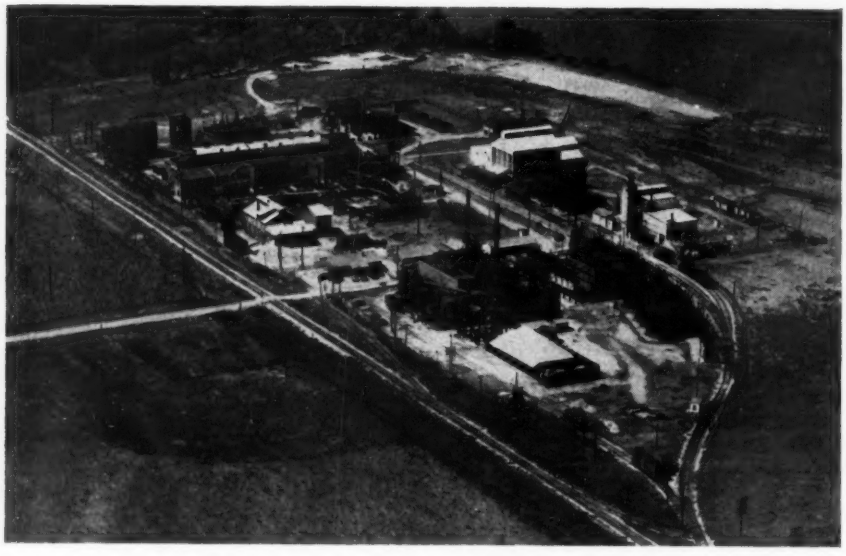
The burgeoning petroleum industry in itself provided a *raison d'etre* for alkali production. The staggering output of crude oil, released by the East Texas discovery in 1930, required tremendous quantities of caustic for refining.

At first all of the alkali plants employed the ammonia-soda process, but later installations provided for electrolysis of brine to produce both chlorine and caustic. Cheap chlorine enabled Dow Chemical Co., at Freeport, Texas, and Carbide and Carbon, at Texas City, to manufacture a gamut of chlorinated derivatives.

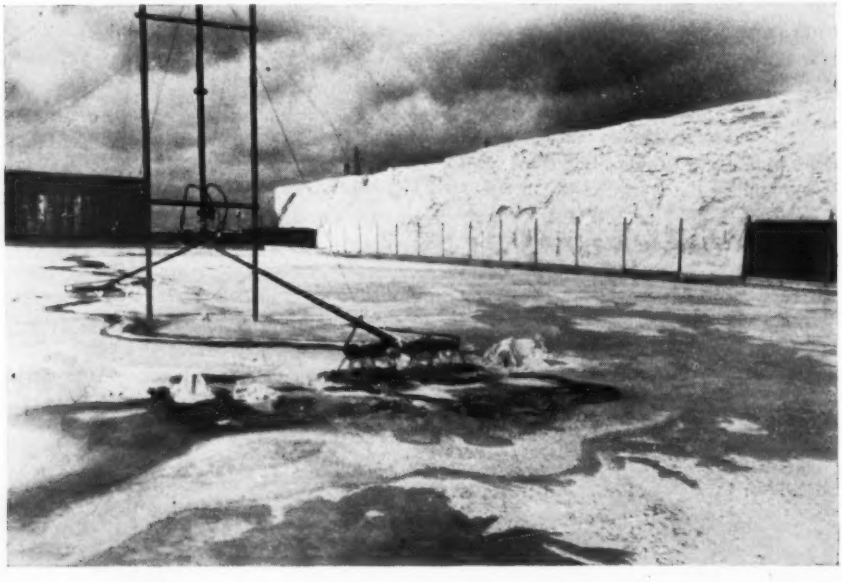
Dow originally came into the picture because of its interest in magnesium, which it obtained from seawater at Freeport. Later it constructed further units, both at Freeport and at nearby Velasco, for manufacture of other chemicals as well. Its products now include elemental bromine (also from seawater), carbon tetrachloride, ethylene glycol, propylene glycol and many other chemicals based principally on hydrocarbons, seawater and salt.

Another early arrival was Carbide and Carbon. It established a large plant at Texas City using, initially at least, cracking gases from the nearby Pan-American Petroleum and Transport Co. refinery as its major raw material. Ethanol, ethylene oxide, ethylene glycol, acetic acid and acetic anhydride are some of its major products.

This period, from the advent of Southern Alkali until the beginning of the war, was one of great activity. But war made previous growth almost *miniscule* by comparison. The enormous demand for explosives and the intermediates used in their manufacture, the overnight need for a billion-dollar synthetic rubber program, marked the end of an era.



The sulfuric acid unit of the Ozark Chemical Co. at Tulsa is representative of heavy chemicals.



Molten sulfur spraying into the storage vat at the Hoskins Mound mine of Freeport Sulfur Co.

AND WAR

Suddenly we needed TNT, cumene, xylidene, butadiene, styrene, mustard gas and a host of other chemicals in quantities undreamed of before December 7, 1941. To this rich but relatively undeveloped territory fell the major share of the responsibility for furnishing these chemical weapons.

Rubber. Of the many tasks accomplished, the gigantic synthetic rubber industry has received the most attention.

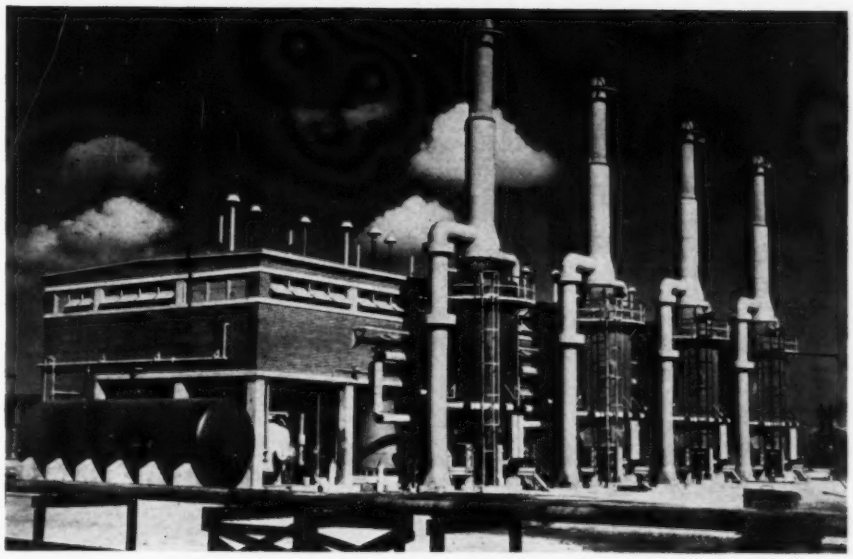
Three categories of plants are required: butadiene, styrene, and the polymerization units in which the monomers are combined to give the final product. In each of these categories the Southwest was predominant, providing about 50 per cent of total national capacity for each product. These plants are still being operated for the account of the Rubber Reserve Corporation, an RFC subsidiary. Their final disposition will probably not be effected until international agreements, upon which depend the price and availability of natural rubber, are clarified. Two exceptions: styrene plants have been sold to their war time operators—Dow, at Velasco, and Monsanto Chemical Company, at Texas City.

Ammonia. Although ammonia does not involve anywhere near the capital required for synthetic rubber, the emergence of the Southwest as a major supplier of

fixed nitrogen may prove equally important in its long-range chemical development.

The four plants constructed in this area represent about 50 per cent of the government capital invested in such units to provide the fixed nitrogen required for explosives. The latest report shows that two of the four have been sold to their war-time operators, Commercial Solvents Corp. at Monroe, La., and Lion Chemical Co. at El Dorado, Ark. Another, at Lake Charles, Louisiana, has been leased to its operator, Mathieson Alkali, and the fourth, the Cactus Ordnance Works at Dumas, Texas, has not yet been declared surplus. The latter plant was operated by Shell Oil during the war.

Since the end of the war these plants have been used for the manufacture of ammonium nitrate for fertilizer. In line with the huge postwar demand for fertilizer, both in the U. S. and abroad, Lion has announced that its capacity for nitric acid is to be doubled.



One of four ethylbenzene cracking units at the styrene plant of Dow Chemical Co., Velasco, Tex.

Ammonia is synthesized from air and natural gas by Commercial Solvents Corp. at Monroe, La.

WARS END

Cessation of military needs did not slow the Southwest's growth: Since V-J Day chemical manufacturers have committed $300,000,000 in new capital to the area. This money will be spent to buy government-financed plants, expand existing facilities, and break ground for new operations. Although nearly two-thirds of the total is for organic chemical production, there are many sizable projects for such inorganic materials as caustic, chlorine and sulfuric acid.

Significant is the observation that practically all of the expansion is in large-volume chemicals. It is characteristic of pioneering industry that manufacturing is confined to a few products whose market is large enough to warrant the investment. Development of plants to produce smaller-volume fine chemicals should follow in the natural course of events.

A major portion of the chemical expansion in this area can best be summarized under the headings: olefinic derivatives, hydrocarbon oxidation products, caustic and chlorine, sulfur and sulfuric acid, plastics, and seawater products. There is much overlapping between these classifications, as in the use of caustic and chlorine for the transformation of olefins into salable products, but there is little expansion that such a grouping will miss.

Olefinic Derivatives. Of the $300,000,000 of postwar chemical capital slated for the Southwest, CHEMICAL INDUSTRIES estimates that close to $100,000,000 will be invested in plants using olefinic hydrocarbons as their major raw material in the postwar era.

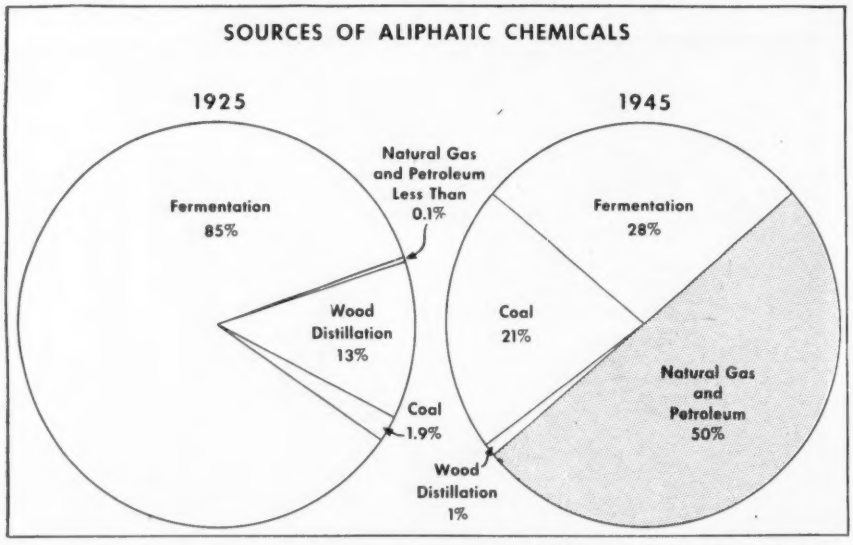
Olefinic hydrocarbons are obtained from two sources: fractionation of cracking-still offgases in petroleum refineries, as in the tie-up between Pan-American and Carbide and Carbon as mentioned above and cracking special hydrocarbon fractions, such as is done at Dow's and Monsanto's styrene plants at Velasco and Texas City respectively.

Conversion to alcohols is one of the important avenues by which olefins are utilized. Oxidation of the alcohols to aldehydes and ketones, and intermolecular dehydration to ethers, are further extensions of the avenue leading to commercially produced oxygenated solvents.

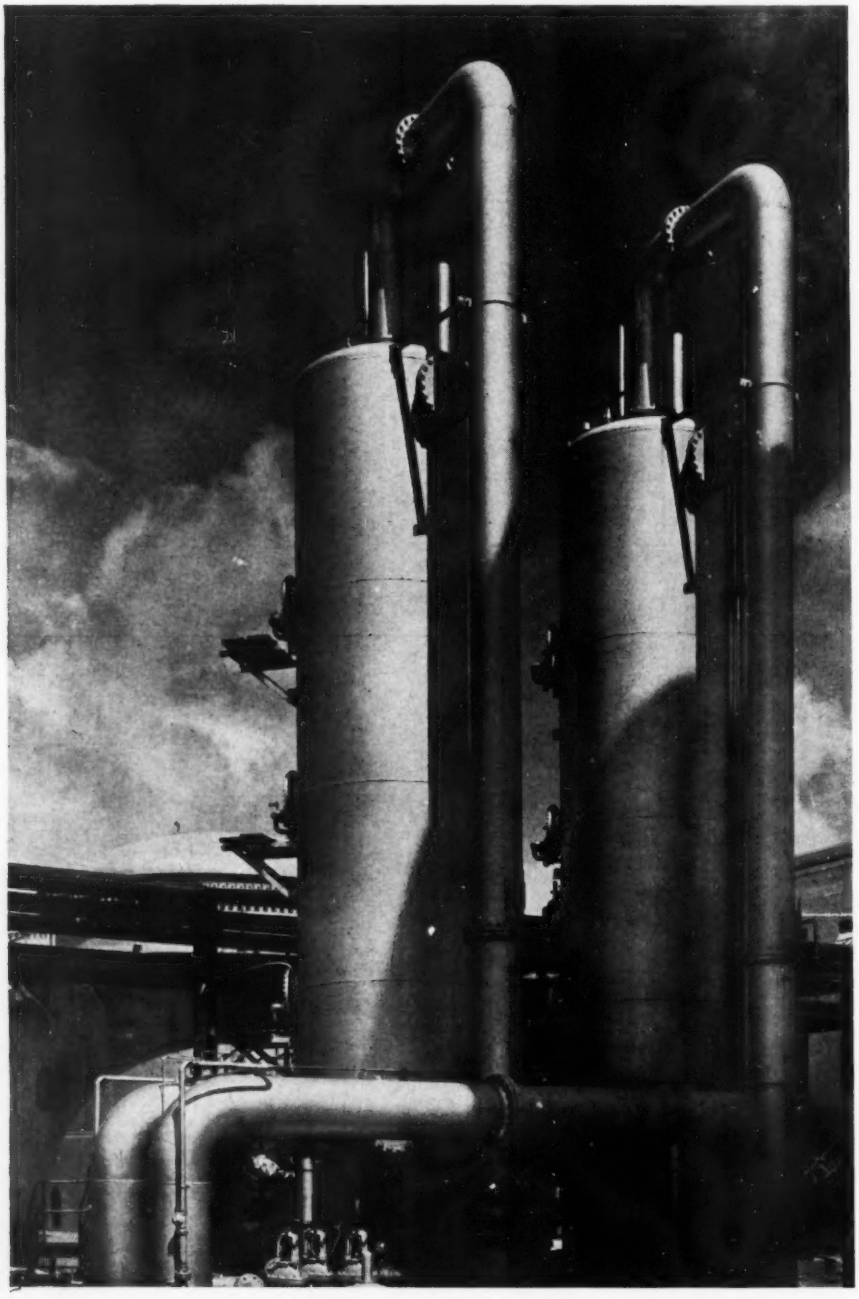
Olefins are absorbed by sulfuric acid to give the corresponding monoalkyl sulfates. Subsequent hydrolysis gives the alcohols or, under more drastic conditions, the ethers. Standard Oil Co., of Louisiana at Baton Rouge, produces ethyl and isopropyl ethers. Shell is building a plant at Houston to make methyl ethyl ketone and secondary butyl alcohol. Both of these, as well as Carbide and Carbon at Texas City, make isopropyl alcohol and acetone. All three now manufacture or plan (Shell projects a plant) to make ethyl alcohol; all of them make various aldehydes and ketones from alcohols.

GLYCOLS AND GLYCERIN

Olefins can be converted to glycols by chlorhydrination and alkaline hydrolysis or by direct oxidation of the olefin and hydration of the olefin oxide. Carbide employs direct oxidation at Texas City, and it is believed that no other manufacturer, with the possible exception of U. S. Industrial Chemicals, Inc., is in a position to utilize this procedure, although the original patent has been invalidated. The original process of chlorhydrination was introduced by Carbide at South Charleston, W. Va., to make ethylene glycol. It is not used, it is believed, at the Texas City plant, but Dow is reported to employ it at Freeport to produce both ethylene and propylene glycols. It is also reported that Jefferson Chemical Co. will utilize this reaction at its Port Arthur plant, which is scheduled to start operating soon.



Carbide and Carbon Chemicals Corp.



Towers of the gas separation unit of Carbide and Carbon Chemicals Corp. at Texas City, Texas.

Chlorhydrination products can be converted into ethylene oxide, polyethylene glycols, acrylonitrile and other important synthetic organic chemicals.

Shell Oil is spending about $10,000,000 at Houston on units to produce allyl alcohol, glycerin epichlorhydrin and glycerin by high-temperature chlorination. This process depends on the fact that at 400°-500° C. chlorination of propylene gives substitution in the methyl group, yielding allyl chloride, rather than the ordinarily expected addition to the double bond to give the dichloride. Hydrolysis gives allyl alcohol, and chlorhydrination of either the alcohol or the chloride gives products hydrolyzable to glycerin.

Hydrocarbon Oxidation. Over $20,000,000, CHEMICAL INDUSTRIES estimates, is scheduled or has been invested since V-J Day in hydrocarbon oxidation plants. Cities Service, pioneer in this field, is expanding its Tallant plant, and Celanese Corp. has jumped its original commitment at Bishop, Texas, from $11,000,000 to $20,000,000. The latter company oxidizes a mixture of C_3 and C_4 hydrocarbons with air to produce formaldehyde, acetaldehyde, acetic acid and anhydride, methanol, propionaldehyde, *n*-propanol and propionic acid. Plans call for the addition of butyl alcohols, methylal, tetrahydrofuran and methyl ethyl ketone to the series of chemicals manufactured.

A significant venture is under way at Brownsville, Texas. Here Carthage Hydrocol, Inc., will use 95 per cent oxygen, from the largest fractionation unit ever constructed, to burn natural gas to carbon monoxide and hydrogen. These will in turn react in a fluidized system to yield gasoline, Diesel oil and a mixture of oxygenated products consisting mainly of alcohols. Just beyond the Southwest border, at Hugoton, Kansas, Stanolind is planning a similar unit.

If economical means of separating the oxygenated by-products can be developed, the oil industry may establish several such plants, relegating the production of many synthetic aliphatics to the position of the motor fuel industry's offspring.

Caustic and Chlorine. Like everything else, alkali and chlorine capacity waxed in war. Dow augmented its Freeport facilities, and Ethyl Corp., at Baton Rouge, produced chlorine as a by-product of metallic sodium manufacture, used in the preparation of tetraethyl lead.

In the eighteen months since war's end, several expansion plans have been sounded: Diamond plans a $10,000,000 unit at Houston; Southern has undertaken to convert the Lake Charles electrolytic magnesium plant, operated in wartime by Mathieson, to caustic-chlorine production; Frontier Chemical Co. is constructing a small unit at Midland, Texas; Diamond has leased a portion of the Pine Bluff (Arkansas) Arsenal for salt electrolysis; and part of Dow's $15,000,000 expansion at Freeport will be used to swell electrolytic chlorine-caustic capacity.

CHEMICAL INDUSTRIES estimates that $25,000,000 is scheduled postwar for this segment of chemical industry in the Southwest.

WHERE THE CHLORINE GOES

Manufacture of chlorinated solvents accounts for a large part of the chlorine consumed in the area. New construction in this field is Dow's $2,000,000 perchlorethylene plant at Freeport. Chloroform, carbon tetrachloride and ethylene dichloride have also been made by chlorination processes at Dow's Freeport plant.

It is understood that the Frontier plant is to produce HCl for acidizing oil wells—a market peculiar to this area. The Consolidated Chemical Co. plant at Fort Worth is presumably manufacturing sulfuric and hydrochloric acids for the same purpose, and Dow, through its Dowell subsidiary, has long been active in promoting oil-well flow by the action of HCl on calcareous oil sands.

The rather recent increase in the use of isomerization processes in petroleum refining has led to large requirements of anhydrous HCl as a catalyst in conjunction with aluminum chloride.

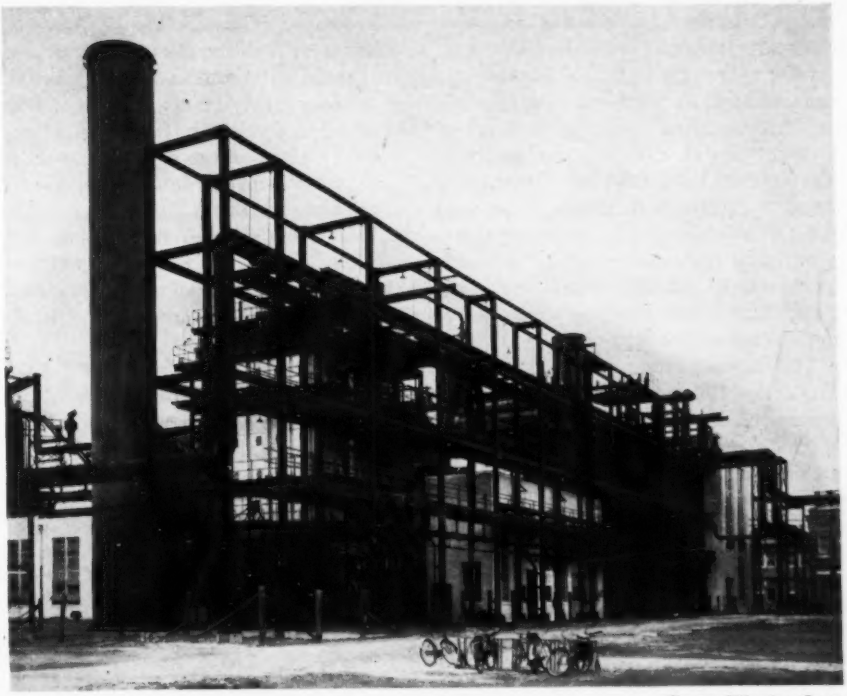
Sulfur and Sulfuric Acid. Although the Southwest supplies the lion's share of sulfuric acid raw material, production of acid itself in this region is relatively minor. Planned postwar expansion is of the order of $5,000,000 at the Fort Worth plant of Consolidated Chemical Co. and at the Tulsa plant of Ozark Chemical Co. Consolidated also has plants at Baton Rouge and Houston, while Southern Acid and Sulphur Co. has Texas plants at Houston and Beaumont and Louisiana plants at Bossier and Shreveport. Some 300 tons per day of Southern's sulfur requirements are met by conversion of high-sulfur natural gas from the MacCamie field in Arkansas to elemental sulfur.

Both Southern and Consolidated process phosphate rock, is shipped in from Florida, to make superphosphate at Houston. Gulf Chemical Co. is planning a $500,000 outlay, also at Houston, to manufacture phosphoric acid and sodium phosphate. Jefferson Lake Sulphur Co. will expend $1,500,000 on a new sulfur-producing property at Long Bend, Texas.

Plastics. CHEMICAL INDUSTRIES estimates that $60,000,000 in private capital has gone or will go into plastic and monomer plants. Carbide will produce "Vinylite" resins at Texas City; Monsanto and Dow have bought the styrene plants they operated during the war at Texas City and Velasco. Monsanto is spending over $3,000,000 for conversion and addition of polymerization facilities.

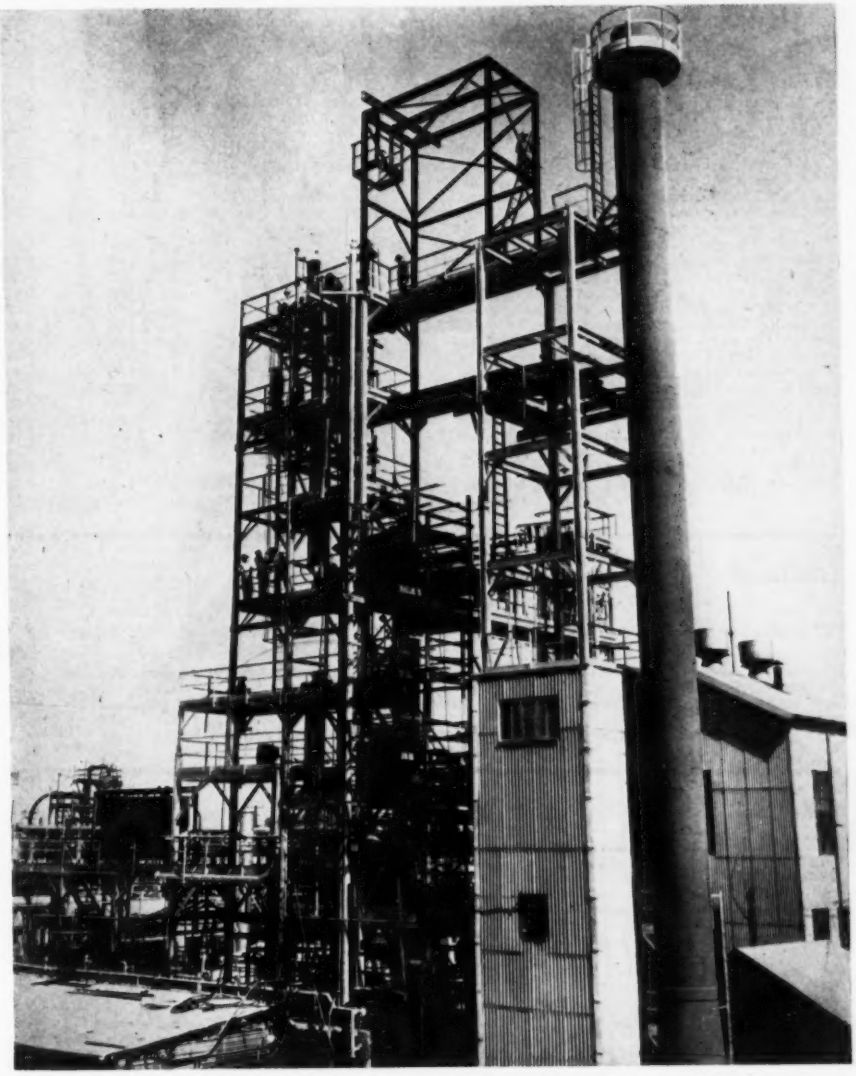
TEXAS NYLON

Of especial interest is the entry of the nation's largest chemical producer into the area: E. I. du Pont de Nemours &



Foster-Wheeler Corp.

The climate is such that a maximum use of out-of-doors construction can be made, as can be seen from the above view of five 300,000 lb. per hr. steam generators at a Port Arthur refinery.



Portents of things to come—installing an experimental unit for the simultaneous production of gasoline and chemicals from natural gas by the Standard Oil Co. of N. J. at Baton Bouge.

Co. is erecting a nylon and polythene plant at Orange, Texas. For the present the nylon raw materials, benzene and ammonia, will be purchased. Benzene will be hydrogenated to cyclohexane at Orange; the closest ammonia supply is the plant at Lake Charles. Cyclohexane from petroleum will probably be used eventually if the cost is low enough, and a methanol unit—convertible to ammonia production by changes in reaction conditions, catalyst and charging stock—is being erected on the site.

The recently announced plant of the McCarthy Chemical Co. (for the production of benzene) at Winne, Texas, a short distance from Orange, may provide a third factor in the scramble to capture this segment of the raw material market for Texas' production of nylon salt for spinning.

Seawater Riches. The first use of seawater as a chemical raw material was by Ethyl-Dow Corp. in the manufacture of bromine at Wilmington, N. C.; now bromine production is centered at Dow's Freeport plant. Most of the bromine is converted to ethylene bromide for use by Ethyl Corp. at Baton Rouge.

Dow also pioneered magnesium from seawater, again at Freeport, and has spent over $35,000,000 for war-developed bromine, magnesium and styrene facilities.

It was mentioned above that the Lake Charles magnesium plant, operated by Mathieson, has been converted to caustic-chlorine production by Southern Alkali. Another magnesium plant, at Austin, Texas, was operated by International Minerals and Chemical Corp. Its disposition has not yet been made.

IN SHORT

The Southwest is growing up. Now it is producing a relatively small numebr of staple, large-tonnage chemicals; in the future there is no reason to doubt that the industry will proliferate and variegate in the pattern of the East.

Nature has brought together here in abundance the stuff of which chemicals are made. Chemical manufacturers have, by their investments, demonstrated their faith in the future of this area.

Just as New York is the hub of commerce and finance, and Chicago, of grain and livestock, so may Houston become a natural capital of the chemical world. Enthusiastic industrialists—usually oil men—will already claim that title for Houston. They may be premature, but at the same time they may well be prophetic.

TABLE III

NEW SOUTHWEST CHEMICAL PLANTS 1945-47

TEXAS

Company	*Location*	*Major Raw Materials*	*Investment (Thousands)*	*Products*
Carbide & Carbon Chemicals Corp.	Texas City	Hydrocarbons	$ 961	Ethylene Amines
Carbide & Carbon Chemicals Corp.	Texas City	Hydrocarbons, sulfur	5,000	Ethanol
Carbide & Carbon Chemicals Corp.	Texas City	Hydrocarbons, sulfur	9,000	Butanol, "Vinylite" resins, and other organic chemicals.
Carthage Hydrocol, Inc.	Brownsville	Hydrocarbons	19,000	Gasoline, oxygenated aliphatic chemicals.
Celanese Corp. of America	Corpus Christi		500	Research
Celanese Corp. of America	Bishop	Hydrocarbons	9,000	Misc. organic chemicals.
Chlorine Solutions Co.	Waco	Salt	200	
Corn Products Refining Co.	Corpus Christi	Grain sorgham	10,000	Starch and Sugar
Consolidated Chemical Co.	Fort Worth	Sulfur, salt	4,000	HCl and H_2SO_4
Diamond Alkali Co.	Houston	Salt	10,000	Chlorine, caustic soda, & hydrochloric acid.
Dow Chemical Co.	Freeport	Salt & hydrocarbons	2,000	Perchlorethylene
Dow Chemical Co.	Velasco	Hydrocarbons	5,000	Ethylene
Dow Chemical Co.	Velasco		30,000	Caustic, chlorine and other chemicals.
E. I. du Pont de Nemours & Co.	Orange	Hydrocarbons	52,500	Methanol, polythene and nylon salt.
E. I. du Pont de Nemours & Co.	La Porte		2,500	Phenothiazine, tetramethylthiuramdisulfide, and iron and zinc dimethyldithiocarbamic acid.
Frontier Chemical Co.	Midland	Salt	500	Caustic, chlorine and HCl.
Independent Oxygen Co.	Houston		100	Oxygen and acetylene.
Jefferson Chemical Co.	Port Arthur	Hydrocarbons	22,000	Ethylene oxide, ethylene glycol and other glycols.
Jefferson Lake Sulphur Co.	Long Bend	Sulphur	1,500	Sulphur
McCarthy Chemical Co.	Winnie	Hydrocarbons	3,000	Styrene and benzene.
Monsanto Chemical Co.	Texas City	Hydrocarbons	3,100	Polystyrene & conversion of war plant.
Nyetex Chemical Co.	Houston		100	
Rohm & Haas Co.	Houston	Hydrocarbons	6,000	Polymethyl methacrylate raw material.
Shell Chemical Co.	Houston	Hydrocarbons, salt	3,000	Isopropyl alcohol & glycerin epichlorhydrin.
Shell Chemical Co.	Houston	Hydrocarbons, sulfur	3,500	Methyl ethyl hetone & sec. butyl alcohol.
Shell Chemical Co.	Houston	Hydrocarbons, salt	2,000	Allyl Alcohol.
Shell Chemical Co.	Houston	Hydrocarbons, salt	7,000	Glycerin.
Shell Chemical Co.	Houston	Hydrocarbon, sulfur	3,500	Ethanol.
Shell Chemical Co.	Houston	Hydrocarbons	6,000	Misc. organic compounds.
Sherwin-Williams Paint Co.	Houston		275	Paint.
Southern Acid & Sulfur Co.	Houston	Hydrocarbons, sulfur, phosphate rock	125	Ammonium phosphate.

LOUISIANA

Company	*Location*	*Major Raw Materials*	*Investment*	*Products*
Commerical Solvents Corp.	Monroe	Hydrocarbons	$4,500	Methanol
Mathieson Alkali Works	Lake Charles	Hydrocarbons, salt	1,000	Sodium nitrate.
Newport Industries, Inc.	Oakdale	Pine trees	2,500	Rosin and turpentine.
Southern Alkali Corp.*	Lake Charles	Salt	6,000	Caustic, chlorine.

* This is additional expenditure to rebuild government magnesium facility.

ARKANSAS

Company	*Location*	*Major Raw Materials*		*Products*
Lion Chemical Co.	El Dorado, Ark.	Hydrocarbons	4000 tons per month	NH_3 treated nitric acid

TABLE IV

WAR PLANT SALES SINCE 1945

TEXAS

Company	*Location*	*Major Raw Materials*	*Cost to Government*	*Selling Price*	*Products*
Dow Chemical Co.	Velasco	Seawater & oyster shell, salt & hydrocarbons	$49,000,000.00	$35,160,000.00	Magnesium, caustic, lime, chlorine, styrene and Thiokol "N"
Monsanto Chemical Co.	Texas City	Hydrocarbons & coal tar	19,250,000.00	9,550,000.00	Styrene

LOUISIANA

Company	Location	Major Raw Materials	Total Investment	Gov't Investment	Product
Commercial Solvents Corp.	Monroe	Hydrocarbons	$20,915,000.00	$6,000,000.00	Ammonia, methanol

TABLE V

NEW SOUTHWEST CHEMICAL PLANTS 1939-45

TEXAS

Company	Location	Major Raw Materials	Total Investment	Gov't Investment	Product
American Cyanamid Co.	Corpus Christi	Alumina, salt	$ 836,000	836,000	Anhydrous aluminum chloride
American Cyanamid Co.	Fort Worth		3,757,000	3,757,000	Synthetic cracking catalyst
American Smelting & Refining Co.	Amarillo	Zinc	706,000		Spelter zinc
American Smelting & Refining Co.	Corpus Christi	Zinc	5,939,000		Electrolytic zinc
American Smelting & Refining Co.	El Paso	Lead			Lead sintered flue dust, lead sintered ores, lead bullion
American Zinc Lead & Smelting Co.	Dumas	Zinc	1,378,000	900,000	Retort slab zinc
Cabot Carbon Co.	Kermit	Hydrocarbons	785,000		Channel type carbon black—grade 9, natural gasoline
Cabot Carbon Co.	Kermit	Hydrocarbons	35,000		Isobutane
Cabot Carbon Co.	Wickett	Hydrocarbons	126,000		Channel black
Cabot Carbon Co.	Wickett	Hydrocarbons	402,000		Isobutane
Carbon Corp. of Texas	Alice	Hydrocarbons	140,000		Carbon black
Celanese Corp. of America	Bishop	Hydrocarbons	11,675,000		Acetaldehyde, formaldehyde, acetic acid, etc.
Cities Service Co.—					
Arkansas Fuel Co.	Carthage	Hydrocarbons	582,000		Butane
Cities Service Oil Co. of Del.	Various	Hydrocarbons	224,000		Channel type carbon black
Consolidated Chemical Industries, Inc.	Houston	Sulphur	1,178,000	99,000	Sulfuric acid
Continental Carbon Co., Inc.	Sunray	Hydrocarbons	2,896,000	2,150,000	Channel carbon black
Crown Carbon Co.	Sunray	Hydrocarbons	86,000		Carbon black
Darco Corp.	Marshall	Lignite	157,000		Activated carbon
Dow Chemical Co.	Freeport	Sea Water	22,509,000	8,631,000	Magnesium
Dow Chemical Co.	Freeport	Hydrocarbons, salt	10,154,000		Methylene chloride, hydrogen, chloride, caustic soda, magnesium chloride, ethylene gas, ethylene glycol, ethylene dichloride, carbon tetrachloride, hydrochloric acid, chloroform, perchlorethylene, hexachlorethane, triethylene glycol
Dow Chemical Co.	Velasco	Hydrocarbons, sulfur	27,324,000	27,324,000	Styrene, thiokol
Dow Chemical Co.	Velasco	Hydrocarbons, chlorine	119,000		Dry chlorine, caustic soda (34%) hexachlorethane, ethylene glycol
Dow Magnesium Co.	Velasco	Sea water	61,617,010	61,585,000	Magnesium metal and alloys
Eagle Picher Sales Co.	Dallas	Tin, lead	40,000		Tin and lead
Eastern States Petroleum Co.	Houston	Hydrocarbons	3,630,000	3,630,000	Butadiene
Ethyl-Dow Chemical Co.	Freeport	Hydrocarbons, sea water	6,016,000		Ethylene dibromide
General Tire and Rubber Co.	Baytown	Hydrocarbons	7,775,000	7,775,000	Copolymer synthetic rubber
Goodrich Co., B. F.	Borger	Hydrocarbons	8,838,000	8,838,000	Copolymer synthetic rubber
Goodrich Co., B. F.	Port Neches	Hydrocarbons	32,428,000	32,428,000	Copolymer synthetic rubber
Goodyear Synthetic Rubber Corp.	Houston	Hydrocarbons	13,166,000	13,166,000	Copolymer synthetic rubber
Great Southern Corp.	Aqua Dulce	Hydrocarbons	830,000	830,000	Normal butane and isobutane
Great Southern Corp.	Banquette	Hydrocarbons	421,000	421,000	Normal butane and isobutane
Great Southern Corp.	Bishop	Hydrocarbons	857,000	857,000	Normal butane and isobutane
Great Southern Corp.	Driscoll	Hydrocarbons	920,000	920,000	Normal butane and isobutane
Hagy, Harrington and Marsh	Amarillo	Hydrocarbons	381,000		Isobutane, isopentane
Hord, W. D.	Lubbock	Air	84,000		Oxygen
Houston Oxygen Co., Inc.	Orange	Air	161,000		Oxygen
Huber Corp., J. M.	Borger	Hydrocarbons	596,000		Channel type crabon black
International Minerals and Chemical Corp.	Austin	$MgCl_2$	15,039,000	15,039,000	Magnesium metal and alloy
Jefferson Lake Sulphur Co., Inc.	Various	Sulphur	251,000		Mining crude sulphur
Jefferson Lake Sulphur Co., Inc.	Clemens	Hydrocarbons	360,000		Carbon black, vent gas
Magnolia Airco Gas Products Co.	Dallas		78,000		Chemicals
Magnolia Airco Gas Products Co.	Houston	Air	472,000	348,000	Oxygen, nitrogen
Magnolia Petroleum Co.	Beaumont	Sulphur	184,000		Sulfuric acid—85-90%
Mission Corp.					
Skelly Oil Co.	Skellytown	Hydrocarbons	226,000		Isobutane
Monsanto Chemical Co.	Karnack	Air, sulphur and Hydrocarbons	34,397,000	34,397,000	TNT, propellant fuel
Monsanto Chemical Co.	Texas City	Hydrocarbons	19,249,000	19,249,000	Styrene
Monsanto Chemical Co.	Texas City	Hydrocarbons	803,000		Formaldehyde ethylene
Neches Butane Products Co.	Port Neches	Hydrocarbons	60,000,000	60,000,000	Butadiene
Nyotex Chemicals, Inc.	Houston	Fluorspar, salt, alumina	1,250,000	506,000	Anhydrous hydrofluoric acid, anhydrous aluminum chloride
Nyotex Chemicals, Inc.	Houston	Limestone	368,000		Dead burned dolmite lime, lime
Phillips Petroleum Co.	Borger	Hydrocarbons	35,478,000	35,145,000	Styrene, butadiene
Phillips Petroleum Co.	Borger	Hydrocarbons	486,000		High modulus furnace-type black
Phillips Petroleum Co.	Borger	Hydrocarbons	6,600,000	6,000,000	Processing of naphtha for production of toluene
Phillips Petroleum Co.	Various	Hydrocarbons	1,559,000		Carbon black channel
Proctor and Gamble Mfg. Co.	Dallas	Fat, salt	5,234,000		Glycerine
Sabine Oxygen Co.					
Houston Oxygen Co. Div.	Orange	Air	161,000		Oxygen
Shamrock Oil and Gas Corp.	Opelika	Hydrocarbons	106,000		Isobutane
Shell Oil Co., Inc.	Houston	Hydrocarbons	1,141,000		Butadiene
Shell Oil Co., Inc.	Houston	Hydrocarbon, salt	2,947,000		Acetone, hydrochloric acid, anhydrous isopropyl alcohol, anhydrous hydrogen chloride, avaro, sulfuric acid, allyl alcohol, diallyl ether, dichloropropylene and dichloropropane
Shell Union Oil Corp.	Dumas	Hydrocarbons, air	3,000,000	3,000,000	Anhydrous ammonia
Sinclair Oil Corp.	Gladewater	Hydrocarbons	137,000		Isobutane and butane mixture
Sotol Co.	Del Rio	Carbohydrate	89,000		Ethyl alcohol
Southern Acid and Sulphur Co., Inc.	Beaumont	Sulphur	755,000		Oleum, 40%
Southern Acid and Sulphur Co., Inc.	Houston	Phosphate rock, sulphur	4,805,000	4,805,000	Triple superphosphate, normal superphosphate
Southern Alkali Corp.	Corpus Christi	Salt	2,000,000		Chlorine, caustic soda, soda ash
Southland Paper Mills, Inc.	Lufkin	Wood	2,168,000		Unbleached Kraft pulp
Southport Petroleum of Delaware	Texas City	Hydrocarbons	906,000		Butadiene and butylene
Standard Oil Co. of Indiana					
Pan American Refining Corp.	Texas City	Sulphur	500,000		Sulfuric acid

Standard Oil Co. of N. J.					
Humble Oil and Refining Co.	Baytown	Hydrocarbons	$54,916,000	44,982,000	Butyl rubber
Humble Oil and Refining Co.	Baytown	Hydrocarbons	14,353,000	13,459,000	Toluol
Humble Oil and Refining Co.	Houston	Hydrocarbons	33,000		Nitration grade xylenes
Humble Oil and Refining Co.	Ingleside	Hydrocarbons	4,172,000	4,100,000	Butadiene
Union Carbide and Carbon Corp.	Texas City	Hydrocarbons	21,277,000		Acetone, ethyl ether, ethylene oxide, acetic acid, acetic anhydride, ethyl alcohol, ethylene glycol, acetylene
Union Carbide and Carbon Corp.	Houston	Air	91,000		Liquid oxygen
Union Carbide and Carbon Corp.	Odessa	Air	93,000		Vaporized oxygen
United Carbon Co., Inc.	Borger	Hydrocarbons	89,000		Dustless carbon black
United Carbon Co., Inc.	Midland	Hydrocarbons	8,783,000	8,228,000	Carbon black
U. S. Government Bureau of Mines	Various	Natural gas	4,287,000	4,287,000	Helium gas

LOUISIANA

Company	*Location*	*Major Raw Materials*	*Total Investment*	*Gov't Investment*	*Product*
Atlas Oil and Refining Corp.	Shreveport	Hydrocarbons	$1,707,000		Butadiene for synthetic rubber, codimer, cumene BB residue, kerosene, fuel oil
Cabot Carbon Co.	Gibson	Hydrocarbons	802,000		Carbon black
Cabot Carbon Co.	McCoy	Hydrocarbons	410,000	410,000	Carbon black
Cabot Carbon Co.	Ville Platte	Hydrocarbons	1,245,000		Carbon black
Chartres Alcohol Co., Inc.		Carbohydrates	75,000		Denatured alcohol, ethyl alcohol
Cities Service Co.					
Arkansas Fuel Oil Co.	Bossier	Hydrocarbons	58,000	58,000	Butadiene
Cities Service Refining Corp.	Lake Charles	Hydrocarbons	17,066,000		Butadiene
Commercial Solvent Corp.	Westwego	Carbohydrates	96,000		Alcohol and derivatives
Consolidated Chemical Industries, Inc.	Baton Rogue	Sulphur	997,000		Sulphuric acid
Copolymer Corp.	Baton Rouge	Hydrocarbons	7,450,000	7,450,000	Copolymer type, synthetic rubber
Cotton Valley Operators Committee	Cotton Valley	Hydrocarbons	1,300,000		Isobutane
Dow Chemical Co.	Lake Charles	Hydrocarbons	125,000		Chemicals (including styrene)
Ethyl Corp.	Baton Rouge	Salt, lead, sulphur, hydrocarbons	6,439,000		Hydrochloric acid, ethyl chloride, lead iodide, ethylene dichloride, metallic sodium, chlorine, salt cake
Ethyl Corp.	Baton Rouge	Salt	4,766,000		Sodium
Firestone Tire and Rubber Co.	Lake Charles	Hydrocarbons	13,724,000	13,724,000	Copolymer synthetic rubber
Gulf Distilling Corp.	Gretna	Carbohydrates	721,000	424,000	Ethyl alcohol—190 proof
Gulf Distilling Corp.	Gretna	Carbohydrates	270,000	270,000	Ethyl alcohol—190 proof
Mathieson Alkali Works, Inc.	Hackberry	Salt	132,000		Ammonia, soda and derivatives
Mathieson Alkali Works, Inc.	Lake Charles	$MgCl_2$	45,253,000	45,253,000	Magnesium, magnesium alloys
Mathieson Alkali Works, Inc.	Lake Charles	Air, salt, $CaCO_3$	273,000		Ammonium nitrate, soda ash, caustic and calcium chloride
Mathieson Alkali Works, Inc.	Lockport	Salt, air	13,985,000	13,985,000	Ammonia, chlorine, sodium nitrate
Mutual Chemical Co. of America	Lake Charles	Salt, chrome ore	550,000	550,000	Sodium bichromate
Oil and Gas Research, Inc.	Ville Platte	Hydrocarbons	1,258,000		Carbon black
Solvay Process Co.	Baton Rouge	Salt	6,726,000		Liquid chlorine
Solvay Process Co.	Choctaw Dome	Salt, $CaCO_3$	196,000		Soda ash
Solvay Process Co.	Winnfield	Salt, $CaCO_3$	67,000		Soda ash
Southern Acid and Sulphur Co., Inc.	Bossier	Sulphur	404,000		Sulphuric acid
Standard Oil Co. of N. J.					
Standard Alcohol Co.	North Baton Rouge	Hydrocarbons	3,277,000		Ethyl alcohol—95%, isopropyl alcohol—90%
Standard Oil Co. of Louisiana	Baton Rouge	Hydrocarbons	48,058,000	37,886,000	Perbunan, butadiene, butyl rubber
Standard Oil Co. of Louisiana	Baton Rouge	Hydrocarbons	6,868,000	683,000	Ethyl alcohol, ethyl ether, isopropyl, alcohol, isopropyl ether, catalyst, 1707, aviation gasoline, 100/135 isopentane, isobutane, alkylate hydrocodimer and CS, cumene isobutane
Swift and Co.	Harvey	Sulphur	142,000		Sulphuric acid
Thermatomic Carbon Co.	Sterlington	Hydrocarbons	600,000		Thermax carbon black
United Carbon Co., Inc.	Perryville	Hydrocarbons	345,000		Carbon black
U. S. Industrial Alcohol Co.					
U. S. Industrial Chemicals, Inc.	New Orleans	Carbohydrates	815,000		Ethyl alcohol, dry ice

ARKANSAS

Company	*Location*	*Major Raw Materials*	*Total Investment*	*Gov't Investment*	*Product*
Aluminum Co. of America	Bauxite	Bauxite	$39,045,000		Alumina, synthetic cryolite
Aluminum Co. of America	Jones Mill	Alumina	29,800,000	29,800,000	Aluminum smelting, electric light and power
Arkansas Smelting Co.	Van Buren	Zinc	52,000		Slab zinc
Athletic Mining and Smelting Co.	Fort Smith	Zinc	641,000		Slab zinc
Barnsdall Oil Co.	Patmos	Hydrocarbons	432,000		Isobutane, normal butane, propane, isopentane, natural gasoline
Batesville White Lime Co.	Batesville	Limestone	62,000		Lime, limestone
Cities Service Co.					
Arkansas Fuel Oil Co.	Macedonia	Hydrocarbons	97,000		Propane and isobutane
Cities Service Defense Corp.	Marche		13,368,000	13,368,000	Ammonium picrate
International Minerals and Chemical Corp.	Texarkana	Phosphate rock	86,000		Refluorinated phosphate
Lion Oil Refining Co.					
Lion Chemical Corp.	El Dorado	Hydrocarbons, air	30,831,000	30,831,000	Ammonium nitrate, ammonia
Lion Oil Refining Co.	El Dorado	Hydrocarbons	2,108,000	2,108,000	Butadiene (feed stock)
Residue Co.	Fort Smith		543,000	543,000	Waelz zinc oxide
Sanderson and Porter Pine Bluff Arsenal	Pine Bluff		57,817,000	57,817,000	Incendiary bomb leading, shell filling, chlorine, lewisite, sulphur monochloride, mustard, arsenic trichloride
Southern Acid and Sulphur Co., Inc.	Lerch	Sulphur	250,000		Natural "sour gas," sulphur

OKLAHOMA

Company	*Location*	*Major Raw Materials*	*Total Investment*	*Gov't Investment*	*Product*
Anderson Prichard Refining Corp.	Cyril	Hydrocarbons	$250,000		Butane and isobutane, asphalt
Cabot Carbon Co.	Guymon	Hydrocarbons	2,856,000	2,177,000	Channel black
Cardox	Claremore		1,484,000	1,174,000	Potassium perchlorate
Eagle Picher Mining & Smelting Co.	Cardin		475,000		Zinc concentrates
Eagle Picher Mining & Smelting Co.	Henryetta	Zinc	689,000	593,000	Slab zinc, metallic zinc, zinc oxide
Mission Corp.					
Skelly Oil Co.	Lyman	Hydrocarbons	305,000		Isobutane, isopentane
National Zinc Co., Inc.	Bartlesville	Zinc	196,000		Slab zinc, F. S. smoke mixtures
Oil and Gas Research, Inc.	Ponca City	Hydrocarbons	69,000		Carbon black
Oklahoma Ordnance Works	Choteau	Hydrocarbons, air	83,441,000	83,441,000	Smokeless powder, tetryl, diphenylamine, TNT, nitration of xylidine
Osterle, Oscar A.	Henryetta	Zinc	163,000		Zinc oxide—60%
Ozark Chemical Co.	Tulsa	Sulphur	1,546,000	1,411,000	Sulfuric acid
Tulsa Chemical Co.	Tulsa	Fluorspar	248,000		Anhydrous hydrofluoric acid
United Zinc Smelting Corp.	Picher	Zinc	71,000		Zinc concentrates

Specifications for a Good RESEARCH REPORT

RESEARCH REPORTS MUST MEET certain simple but fundamental requirements if they are to be of greatest use. For this reason, Dr. Johan Bjorksten, president of Bjorksten Research Laboratories, Chicago, recently prepared the following excellent set of specifications for the guidance of his own staff members. We are indebted to him for permission to bring them to the attention of other chemical researchers.

THE purposes of a monthly progress report are:

1. To give a clear picture of the subject of the report, with a minimum of effort required by the reader.

2. To focus in your own mind a birds-eye view of your work, so as to show up opportunities for progress or flaws to be corrected.

3. To give the reader a favorable impression of the quality of our work, with regard to

   a. intelligence of planning
   b. intelligence of execution
   c. accuracy of the work
   d. amount of work done within the period
   e. clarity of presentation

To accomplish these purposes the report must be organized as follows:

1. *Summary:* This should state, in broad outline, the main points of the report. It should not occupy more than two typewritten sheets and may be much shorter. Sentences should be terse. It should be so written that an intelligent non-technical man in two minutes can obtain a good picture of what has been accomplished.

2. *Details:* This is usually the main body of the report. It may be divided under subheadings, according to the contents. It should contain the experimental data obtained, with all pertinent factors fully stated.

All data that can be presented in charts or diagrams must be so presented.

All data that cannot be graphed, but can be tabulated, must be given in tables.

The details must be given so that the technical man reading the report understands without effort why the various tests were made and has enough detail to repeat any test reported without having to ask further questions.

The report must form a logical entity, so that results that deviate from a norm are immediately spotted.

3. *Discussion of the results, and statement of the approach currently followed:* This section should show the technical man reading the report what conclusions we draw from the data presented, what we feel they imply in terms of practical steps to be taken, and what lines of work we are currently following. It is necessary to make these points stand out, so that the technical staff of our client can clearly follow our thinking, and comment promptly when they feel comments are due.

GENERAL RULES

A technical report should not hedge. Avoid indefinite terms such as "appears", "seems", and the like. If you cannot say that the finding *is* thus and so, go back to the laboratory and make certain.

Use a positive form of statement in preference to a negative, whenever possible.

Any key result must be checked three times before reporting.

After you have drafted a report, check it as follows before sending it to the office.

Look over charts, diagrams, and tables. If some result deviates from logical expectations, check it, and add a footnote that it was checked. Check the tables to make certain that the data are complete in all columns.

Put yourself in the place of a chemist who reads your report as a stranger. What questions would you ask if you were he? Answer these questions at the points in the report where they arise. Where this is not possible, show at least that you recognize the questions, and show what you are doing to obtain the answers.

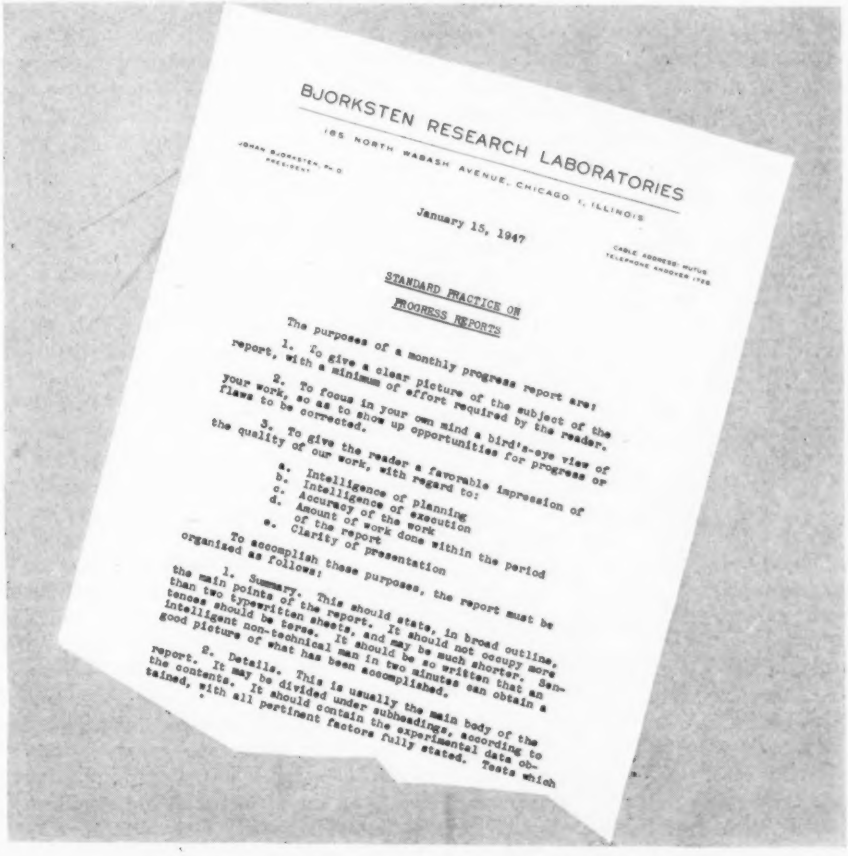
If you submit the draft of the report for final typing in your own writing, do not use abbreviations you would not wish to retain in the final report. See that paragraphs are marked. The typist is likely to copy the report exactly as you submit it.

Read the report a last time, asking yourself:

"Could anything be misunderstood?"

"Could anything be stated in fewer words?"

All progress reports must be in the office four days before their due date.



BJORKSTEN RESEARCH LABORATORIES

165 NORTH WABASH AVENUE, CHICAGO 1, ILLINOIS

January 15, 1947

STANDARD PRACTICE ON PROGRESS REPORTS

The purposes of a monthly progress report are:

1. To give a clear picture of the subject of the report, with a minimum of effort required by the reader.

2. To focus in your own mind a bird's-eye view of your work, so as to show up opportunities for progress or flaws to be corrected.

3. To give the reader a favorable impression of the quality of our work, with regard to:

a. Intelligence of planning
b. Intelligence of execution
c. Accuracy of the work
d. Amount of work done within the period of the report
e. Clarity of presentation

To accomplish these purposes, the report must be organized as follows:

1. Summary. This should state, in broad outline, the main points of the report. It should not occupy more than two typewritten sheets, and may be much shorter. Sentences should be terse. It should be so written that an intelligent non-technical man in two minutes can obtain a good picture of what has been accomplished.

2. Details. This is usually the main body of the report. It may be divided under subheadings, according to the contents. It should contain the experimental data obtained, with all pertinent factors fully stated. Tests which

Sample of a standard first page for a research progress report.

Plant YIELD STUDIES Cut Losses

by G. F. SCHLAUDECKER
Maumee Development Company
Toledo, Ohio

CURRENT RAW MATERIAL SHORTAGES have made the study of plant yield problems of prime importance. And, as soon as a fully competitive economy is restored, yields may become even more vital to profitable operation. Here the author presents stimulating philosophy and a concrete program for tackling the problem of reducing or controlling plant losses.

EACH 1% of yield lost costs the American chemical industry about $20 million a year. On the average raw materials amount to 25 or 30 cents out of each sales dollar, and the finished product at the plant accounts for 50 or 60 cents out of the sales dollar. Thus the average value of materials lost may range from 25 to 60% of the market value of the product, depending upon whether the loss occurs at the beginning or at the end of the process.

Yields, and the losses that keep them down, are subject to constant scrutiny in chemical plant operations. But losses occur in many places and they have such a disturbing way of hiding from view that it is usually advisable to augment routine yield checking with frequent intensive plant yield studies to uncover elusive sources of loss and to make corrective changes in equipment and procedure where they are justified.

WHERE LOSSES OCCUR

While losses of raw materials, process flows, and products happen in many ways and places, it is possible to classify practically all of them into one of three groups: chemical and process losses, mechanical losses, and those resulting from human errors.

In efficient chemical processes the losses legitimately classed as chemical and process account for the greater share of the total. Yield forfeitures in this class are those that occur because of the fundamental chemistry of the materials—by-products, polymers, sludges, cokes, gaseous decomposition products, etc.

Also in this category are those losses which are recognized and accepted deliberately because of process and recovery economics. By-products and process wastes usually carry with them some amounts of product material. While substantially complete recovery of product losses associated with wastes is theoretically possible, there is usually an economic limit to recovery operations. Thus filter muds, distillation bottoms and tail gases are often discarded although they still contain known amounts of product. The expense in equipment and operation to effect a higher recovery is not justified by the losses that are allowed. In a similar manner many processes are intentionally operated at yields below the ultimate in order to achieve a practical percentage conversion or an effective reaction rate.

Often these chemical and process losses are subject to variation with respect to changes in the production rate. When a plant is operated below its normal capacity, recoveries and yields can frequently be squeezed up a little higher by utilizing the excess equipment capacity. In the same manner yields and recoveries are often sacrificed to inch out more production when the demand for the product is high.

Mechanical losses are normally small, but they do get momentarily out of hand by accident, or through faulty maintenance and operation. In this class are: leaks, vapor loss, entrainment, dusting, bleeding of filter media, incomplete unloading, etc. Design engineers try to anticipate and provide for trouble spots. But, by and large, plants are designed on the assumption that mechanical losses will be negligible with proper operation and maintenance. When the frequency or severity of such losses becomes too great, design changes may be in order.

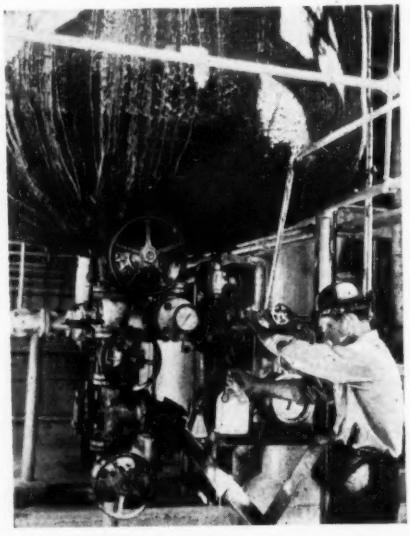
Losses caused by human failings are probably the most agonizing of all, for, in theory at least, they are 100% avoidable. These embrace a large group of spills, overflows and general boners. They are often very difficult to foresee and still more difficult to eliminate entirely. Many such losses resulting from habitually careless and sloppy operation represent an almost constant, uniform waste—spills around filter presses, tray dryers, sampling, etc. Others of large magnitude occurring at odd intervals constitute major yield catastrophies. In a large, well-run plant such things as these have happened: A maintenance man dismantled a valve from the bottom of a full tank, causing the loss of 10 tons of a valuable product. An operator started a pump to fill a tank with raw material then forgot about it, by the time he got back several thousand gallons of a valuable liquid had overflown the tank and gone down the sewer. Another operator ran the wrong materials into a charge causing the complete loss of the batch. Every plant has many legends of such boners—they are not the sole property of any operator or any plant.

Human failings are commonly treated as disciplinary or training problems, which most of them are. However, cures are often effected more rapidly and permanently—and to the greater satisfaction of all concerned—by changes to the equipment or operating procedure that will preclude their occurrence in the future.

WHERE LOSSES HIDE

The recognition of possible and probable sources of loss is usually easy compared to actually finding them, for losses are hidden in many ways and places. Hiding places fall into two general classes—nature's and man's.

Nature's hiding places are those subtle points at which leaks can occur unde-



The intensive plant yield study is too big a job for regular plant personnel—a special crew must be assigned to the yield study.

tected—underground lines, vapor vents, behind heavy lagging, and into water and steam jackets.

Man's hiding places are the more serious because man is so much more resourceful in his neglect and in his illusions. Man-made hiding places for yield losses are of three types: (1) Those that are due to the innocent acceptance of his own measurements. (2) Those resulting from illusory assumptions regarding the purity of his products. (3) Those caused by his conscious distortions in observing and reporting the facts.

In most plant operations meter readings, scale weights, tank calibrations and chemical analyses are so commonplace that they are accepted without question. Yet such acceptance frequently leads to serious errors. The compounding of measurements without consideration of their probable accuracy can be even more misleading.

Under ideal conditions the common types of plant scales may be capable of accuracies up to ¼ of one per cent. In average plant conditions one per cent accuracy is a more likely figure. The maintenance of even this modest accuracy requires reasonable care in operation and frequent scale checking and adjustment.

Tank calibrations vary with both time and temperature. Many tanks, particularly wooden ones, gradually change shape over long periods. They become elliptical; the bottoms sag and bulge. Calibration errors of 2% or more have been found over two-year periods. Only periodic recalibration can maintain suitable accuracy.

Volumetric measurements, in general, are too readily accepted. A great many organics and many water solutions of salts undergo volume changes of 1% for each 10 to 15° C. change in temperature. This condition is widely recognized in the correction of density readings, but it is often overlooked in the application of analyses. Thus an analysis at 20° C., showing 37 gms. per liter may be applied to a flow or inventory volume measured at 60° C. to give an erroneous overstatement.

Analytical procedures have vagaries all of their own. While this is too specialized a topic for treatment here, chemical analysis has many subtle ways of camouflaging the facts of plant yields.

Perhaps the most common errors of all are those resulting from ignorance of the significance of numbers and the proper methods of handling probable errors. Quantities are often reported in astronomical figures—208,907.24 gallons—even though the figures may be meaningless beyond the third or fourth digit. Such numbers come, of course, from following the rules of simple arithmetic on measurements which normally represent no more than about 1% accuracy. This practice, in itself, is not particularly deceptive, but when another quantity is determined by taking the difference between two such large numbers, the results can be entirely misleading. For example: A recent report in the literature showed this type of calculation—

Charge	39,511,867 lbs.
Production	38,791,317 lbs.
Loss	720,550 lbs.

Actually this figure may be worthless. If the accuracy of the charge and production figures were 1%, and the probable errors were properly accounted, the figures would be—

Charge	39,511,867 ± 395,119 lbs.
Production	38,791,317 ± 387,913 lbs.
Loss	720,550 ± 783,132 lbs.

The rules are well known, but seldom used. In addition and subtraction, add errors: in multiplication and division, add percentage errors.

The second type of man-made hiding place for losses is that of assumptions regarding the purity of the product. There is a beguiling bit of folklore around many plants which holds that the product is one single component of 100% purity—every 100 lb. bag shipped out is exactly 100 lbs. of the prescribed major ingredient. Actual analyses of the final product are blithely ignored, even where specifications call for the inclusion of 1 or 2% of certain additives, or for drying to only 4, 5 or 6% moisture.

Often the expression of doubts as to the purity of the product is like unto questioning the virtue of Caesar's wife. In one actual case, overall plant yields of 101 to 102% were continually reported. These absurd figures resulted from assuming the product to be 100% pure, when in reality it was carefully dried to a final moisture content of 6%. Yet some of the people involved in this case scoffed at the idea that there could be any hidden losses. The accumulated losses finally came to light when a sewer sump became plugged—cleaning removed several tons of the product which was probably only a fraction of the actual loss.

The third type of man-made hiding place for losses is the conscious distortion of yield data. These practices run all the way from shading the readings a little on the high side, to actually juggling the inventory figures.

Minor spills constitute an almost constant, uniform source of loss around many operations where manual handling predominates—tray dryers, filter presses, batch kettles, etc.

HOW TO UNCOVER LOSSES

The knowledge of where losses occur and how they are hidden is merely a preliminary essential to the real problem of finding and correcting the losses. Although good operating practice keeps yields and losses under routine surveillance, it is usually necessary to augment these regular measures with special, intensive plant yield studies. Properly done, a yield study constitutes too big a job for the already harassed and overburdened operating supervision. It is the full-time task for several men, and it may require anywhere from several weeks to many months.

A thoroughgoing investigation of plant yields has three parts: preparation, testing, and application of the findings.

Preparation for the intensive yield survey is important, for the final success of the venture depends on a careful make-ready. This phase of the job necessitates taking the following steps:

1. Make a complete, detailed flow-sheet of the entire plant. This diagram

must show every piece of process equipment, every process line and valve, and, all vents, stacks and sewers.

2. Examine and verify all analytical procedures that are in use and any special ones that will be needed.
3. Determine all points where measurements and samples must be taken, and devise an accurate procedure for obtaining and computing the results.
4. Procure and install any special equipment that may be needed in sampling, measuring and analyzing.
5. Examine and check the accuracy of all equipment that will be used in measuring. This includes scales, tank calibrations, and instrument accuracies.
6. Set up a procedure for actually taking the data and train the test crew.

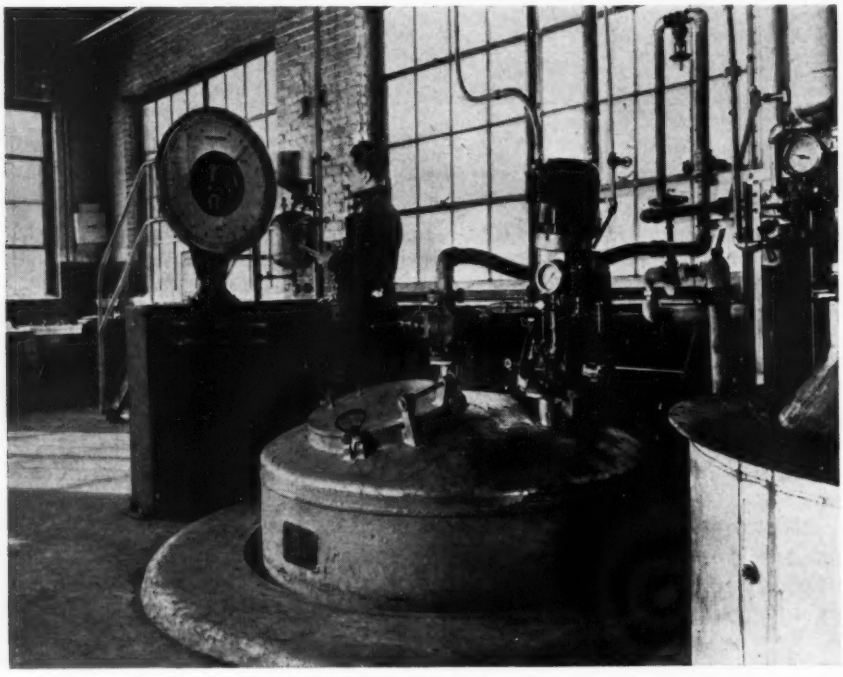
Most of these steps are straight-forward, but there are four general principles which should guide the formulation of the test procedure and the preparatory moves.

First, the only entirely reliable basis for determining yields is by an overall weight balance. Actual weight measurements should be made to the greatest possible extent, and these should be made with extreme care to insure their accuracy. Obviously it would be impractical to install scales at close intervals throughout the plant, so some measurements of flow and volume will probably be necessary. Here again care is required, particularly in the application of suitable corrections.

Second, it is necessary actually to measure losses. Values obtained by the difference between large numbers can be completely meaningless, as previously shown. Loss measurement entails the determination of flow and composition of every waste, effluent and vent stream leaving the plant. Preliminary examination of sewers and vents may help to locate points where measurement should be made.

Third, a subdivision of the process into groups of equipment, or even to single units, is necessary both to facilitate the work and to isolate individual points of loss. Zones of subdivision often occur naturally at scale locations and inventory points.

Fourth, the duration of the test must be great enough to minimize the effect of inventory differences. A suitable period can be derived on the basis of the actual "in process" inventory for each zone. A good test period is one in which the throughput exceeds the inventory by ten times. Too short a run introduces a large probable error in the inaccurate figure for the difference between the initial and final inventory.



The weight balance is the only satisfactory method for determining yields. If volumeteric measurements must be used, great care must be taken in making the proper corrections.

Proper preparation makes the actual test run a matter of routine in so far as the measuring and sampling is concerned. It is important, however, that this routine should not overshadow the substantial job of observing and recording the variations in technique of the different operators. It is not uncommon to find that each operator has derived variations of his own to the standard and prescribed operating methods. Frequently these represent improvements in yields. Sometimes they do not. Only careful observation and recording will pick up all these minor but significant variations.

When the final weight balances have been computed the total unaccounted for loss should be less than 1%. If proper care has been taken, and, the unaccounted for loss exceeds this value, it is likely that some losses have escaped detection.

WHAT TO DO WITH THE RESULTS

The final objective of the intensive yield investigation is the correction of all sources of loss where corrective measures can be justified economically. The application of the new yield knowledge often pays handsome returns for small expenditures.

Corrective measures should start with the revision of routine yield and loss determinations. The aim here is to eliminate as far as possible factors that hide losses—to devise a system that will expose losses so they can be controlled or reduced. Revision of sampling, measurement, analysis, operating procedures, and the calculation and reporting of yields may be in order.

Often better yield control is achieved by the installation of continuous samplers, or recording instruments for measurement of flow and analysis, on critical waste and effluent streams.

More permanent corrections may be achieved through minor equipment modifications. Both process and mechanical losses are frequently higher than necessary because of simple "bottle-necks" in parts of the equipment. Losses due to human failings can sometimes be eliminated by a few physical changes that would reduce or eliminate the incidence or severity of spills and boners. Frequently additional recovery equipment is justified by increases in production rates or operating costs since the plant was built. Some effluents can be recycled to the process to aid in recovering valuable ingredients.

Many plants have found it worthwhile to isolate the sewers and floor drains from areas where spills are frequent. Such drains are run to a sump where they are collected for return to process.

Entrainment losses have been reduced by such simple expedients as installing separators in the line or baffles in equipment. Often straightening out lines or enlarging their cross-section is sufficient. And, in cases slight changes in operation will minimize entrainment.

Extra equipment can mitigate losses from dusting and cloudy filtrates. Level controls and limit switches have stopped losses from overflows. New storage tank designs have minimized vapor losses.

The intensive study of plant yields and losses is a fruitful method of increasing profits. Periodic investigations are necessary because conditions change and losses are persistent. The well planned and executed survey of chemical plant yields will bring losses out of hiding and will provide a sound basis for reducing and controlling them.

STARCH Prevents Scaling In Navy's EVAPORATORS

by CAPTAIN CARL J. LAMB, U.S.N.R.,
New York, N. Y.

COLLOIDAL STARCH, which solved the Navy's evaporator-scale problem, may be of benefit to chemical plant installations using sea water.

ANYONE who ever operated evaporators to produce fresh water from sea water knows that the most difficult and expensive part of such operations is descaling the tubes, which must be done every thousand hours or less.

Previous to World War II it was thought that the formation of scale, and the consequent securing of the evaporator in order to remove scale, was a necessary evil. While the Navy had brought evaporators to a remarkable degree of efficiency, and while steps had been taken to increase the period of time between hand scaling of tubes (by "chilling and cracking" with cold-water sprays) nothing of value had been accomplished toward the prevention of scale formation.

In the summer of 1941, Rear-Admiral (then Captain) Thorwald A. Solberg, U. S. N., who had developed the Navy method of treating boiler water, suggested to the Engineer Officers of the U. S. Fleet that they experiment with a starch treatment of evaporator feed water in accordance with a procedure he had worked out on laboratory scale, using an extremely successful and efficient boiler compound containing a fraction of edible corn starch. It had been noticed that when boilers so treated were opened, the tubes were coated with a very fine film of colloidal starch, and that they were clean of any scale or other foreign material.

The cruisers on which the writer served during the War were equipped with two sets of double-effect evaporators, each set designed to produce, with clean tubes, 20,000 gallons of fresh water per day, but after 1,000 hours of service their capacity was down to 24,000 gallons per day.

MORE WATER NEEDED

While the cruisers originally were designed for a complement of about 800 officers and men, the wartime force exceeded 1300. As the result of the enormous expansion of the Navy, the demand for water went up disproportionately because the majority of these new officers and men neither knew how to use and conserve water nor realized the necessity for so doing.

It is therefore understandable that Admiral Solberg's suggestion aroused great interest, and practically all engineer officers tried it out. The majority soon satisfied themselves that it "wouldn't work" and discarded the idea, but a few persevered and worked it out with amazing results. The equipment for treating evaporator feed (salt) water with starch, as the writer used it on the U.S.S. Indianapolis, consisted of a mixing tank, an 1800 g.p.h., 25 psi, motor-driven centrifugal pump, ½" discharge piping, 2 needle valves, a gauge, 2½" stop valves, 2 pet-cocks, 1½" by-pass valve and piping, and 1½" agitator nozzle in mixing tank. The mixing tank held 60 gallons. The slurry of starch and water was fed to the evaporators at the rate of 2 gallons per hour to each set, the excess of 1796 gallons per hour returning to the mixing tank thru the agitator nozzle. The needle valves were used to regulate the flow of starch slurry to the feed piping of the evaporators at an absolutely controlled and regulated rate which could be checked by closing the stop valves and opening the petcocks.

COLLOID TAKES EFFECT

The starch in the evaporator seems to form a colloidal film over the hot tube surfaces. When the precipitated sea salts attempt to attach themselves to the tubes, the starch will not support their weight; they leave the tubes, therefore, and are discharged thru the brine line continuously. New replacement starch must be introduced at a regular and controlled rate to maintain a proper starch film on the tubes. The use of too much starch causes increased scale formation, as does intermittent, rather than regular, feed of the slurry. Unless the slurry is continuously agitated, as by the by-passed pump discharge through the agitator nozzle, the starch will settle.

Water containing impurities, especially salts, has a tendency to "prime" in boilers or evaporators—especially vacuum evaporators. Starch very definitely reduces or "dampens" priming. As a result of this fact, a higher water level can be maintained, thus giving greater tube submergence and higher heat transfer, which accounts for the greater output.

POINTS TO OBSERVE

In order to obtain results comparable to those given, it is important to observe the following points:

1. It is necessary to keep the starch thoroughly dispersed in the slurry.
2. The starch slurry must be introduced into the evaporator feed lines as far as possible from the evaporator, in order that it be well dispersed in the evaporator feed water.
3. Needle valves or orifices must be used to give an absolutely controlled rate of feed of starch slurry.
4. The use of a 30 GPM pump for both feeding and agitation affords simple operation, and is preferable to a smaller pump plus a motor-driven agitator.
5. The proper amount of starch to be used for a particular installation must be ascertained by trial.

It is believed that the use of starch to prevent scale formation in evaporators, as perfected by the Navy for use at sea, may be applicable to many shore installations where salt water is fed to evaporators or other heat exchangers.

PERFORMANCE ON U. S. S. INDIANAPOLIS

	PREVIOUSLY	*WITH STARCH*
Water distilled per day (average) with clean tubes	33,600 gal. (*over 10-year period*)	45,100 gal.
Water distilled per day (average) after 1,000 hours	24,000 gal. (*secured to clean*)	**42,860 gal.** (*operated for 13,000 hours at same rate*)
Scale removed per week by chilling and cracking	280 lbs. (*heavy scale*)	18 lbs. (*thin scale*)
Maximum operating period before cleaning and descaling required	1,000 hours	indefinite

Do Your Labels Protect You?

by LILLIAN GORDON, Safety Research Institute
New York, N. Y.

CONSUMER CHEMICALS MUST BE LABELED ATTRACTIVELY, but it is equally important that the labels adequately warn the user of hazards. Otherwise the packager may lose good will, provoke restrictive legislation or—even greater jeopardy—lay himself open to costly damage suits.

THE MARKET-WISE chemical packager chooses a label of distinctive design, aimed at attracting the eye of the consumer; but attractive design does not always mean an adequate label. Many household chemicals, when improperly used, present certain hazards. In these cases, it is essential that sufficient cautionary information be on the label so that the consumer has some protection against accident.

In the past the attitude all too often has seemed to be, "Let's not mention hazards. Perhaps no one will be the wiser." On the part of the chemical manufacturer, experience has resulted in a marked change in attitude. Today he realizes that proper cautionary labeling provides him with a measure of protection against liability, restrictive legislation, and loss of good will. The repackager, however, seems much less cognizant of the need for adequate cautionary labels unless such labels are required by law.

Manufacturers, shipping to all sections of the country and to a variety of markets, are naturally more aware of the types of legislation and the many different accusations which have been aimed at their products. Also, the lively interest of authorities in the field of occupational health has contributed no little to the manufacturer's awareness of responsibility. Repackagers, in many cases more localized in distribution or selling only to the home market, often go in ignorance of these developments until some untoward incident occurs.

NEGLECT CAN BE COSTLY

Yet it is equally to the interest of the repackager that he be protected through the use of a proper cautionary label. Lawsuits, restrictive legislation and loss of good will, retailer as well as consumer, can be as harmful to him as to the manufacturer. Furthermore, adverse publicity resulting from injuries or illness caused by inadequately labeled products can cut into sales more deeply than the imagined consumer resistance to proper warning labels. Even the dread skull and cross bones is not the deterrent to sales that sales managers sometimes believe: The widespread use of tincture of iodine gives the lie to that notion.

Certain products, of course, are required to bear cautionary statements in accordance with the Food and Drug Act, Insecticide Act, Caustic Poison Act, and various state laws. But these laws apply only to a relatively small number of household chemicals. Interstate Commerce regulations deal only with shipping problems and do not take the problems of the ultimate consumer into consideration.

Here are some examples of the dangers of inadequate labeling: In a New England factory, last year, two cleaners were given a flammable mixture with which to clean a floor. There was no indication on the label that the mixture was flammable. Incorrect cleaning procedure resulted in an explosion and fire, in which one of the cleaners died. This incident led the judge at the inquest to make the following statement: "This investigation has importance beyond the duty of seeking the responsibility for the horrible death which [the victim] met. It appears, perhaps due to war conditions, that there are on the market for sale to the public for various purposes . . . many highly flammable fluids inadequately marked as to their use and the dangers involved in using them.

"There is no direct rule regulating the use of these substances in this state. The Public Safety Department is aware of this danger and is studying the situation."

In another instance, a woman used about a gallon of a mixture containing toxic solvents to clean a rug in a room with windows closed. No warning on the label urged her to ventilate the room or to avoid inhaling the vapors. Her death followed in a few days, and the company which had prepared the cleaning fluid was judged responsible. The suit was settled for $10,000.

Again, a large department store in the East had several expensive experiences along similar lines.

A woman was sold a package of cleaner for the tapestry cover of her davenport. The cleaner, a mixture of solvents whose vapors are dangerous in high concentrations, was used "according to directions" and did an efficient job of cleaning the tapestry. However, these "directions" said nothing about the need for ventilation. The result was that the woman

ACETONE

DANGER! EXTREMELY FLAMMABLE

Keep away from heat or open flame.
Use with adequate ventilation.
Avoid prolonged breathing of vapor.
Avoid prolonged or repeated skin contact.

PHENOL

DANGEROUS BECAUSE RAPIDLY ABSORBED THROUGH SKIN
CAUSES SEVERE BURNS

Do not get on skin or in eyes.
Avoid breathing vapor.
Do not take internally.
In case of contact, immediately flush with plenty of water; remove and wash clothing before re-use.

Figure 1—The MCA recommends these labels.

sued the department store for $150,000, claiming injury to her kidneys. The case was finally settled out of court.

This same store was sued when the death of a maid was attributed to the use of another solvent mixture purchased there. In this instance, the maid did not use the solvent "according to directions," but the judge decided that the store should be held responsible because "the directions on the can are insufficient in view of the very dangerous nature of the fluid."

The financial loss and adverse publicity both to the store and to the cleaning fluids involved in these cases were considerable.

As a result of such experiences, manufacturers of chemicals now recognize the long range value to themselves of using adequately informative labels. To be preferred, of course, is the voluntary use of labels acceptable both to the producer and to health and safety authorities.

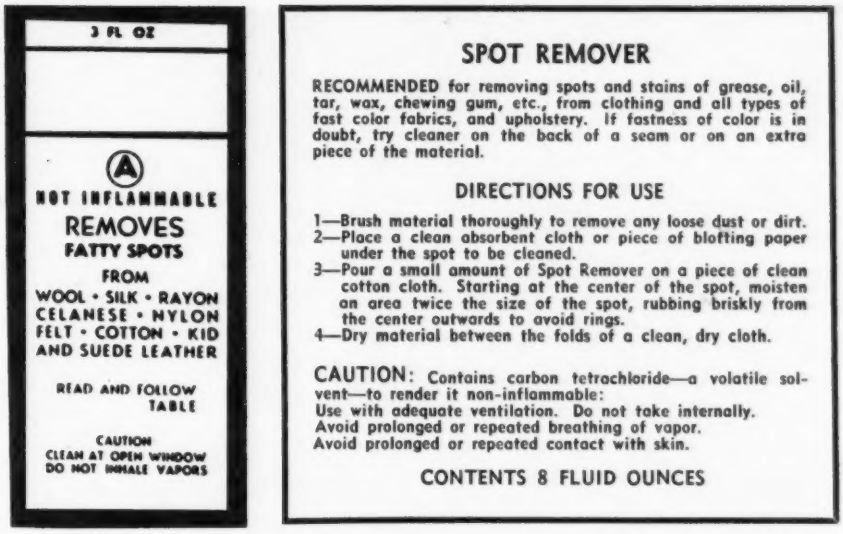

3 FL OZ
NOT INFLAMMABLE
REMOVES
FATTY SPOTS
FROM
WOOL • SILK • RAYON
CELANESE • NYLON
FELT • COTTON • KID
AND SUEDE LEATHER
READ AND FOLLOW
TABLE
CAUTION
CLEAN AT OPEN WINDOW
DO NOT INHALE VAPORS
SPOT REMOVER
RECOMMENDED for removing spots and stains of grease, oil, tar, wax, chewing gum, etc., from clothing and all types of fast color fabrics, and upholstery. If fastness of color is in doubt, try cleaner on the back of a seam or on an extra piece of the material.
DIRECTIONS FOR USE
1—Brush material thoroughly to remove any loose dust or dirt.
2—Place a clean absorbent cloth or piece of blotting paper under the spot to be cleaned.
3—Pour a small amount of Spot Remover on a piece of clean cotton cloth. Starting at the center of the spot, moisten an area twice the size of the spot, rubbing briskly from the center outwards to avoid rings.
4—Dry material between the folds of a clean, dry cloth.
CAUTION: Contains carbon tetrachloride—a volatile solvent—to render it non-inflammable:
Use with adequate ventilation. Do not take internally.
Avoid prolonged or repeated breathing of vapor.
Avoid prolonged or repeated contact with skin.
CONTENTS 8 FLUID OUNCES

Figure 2—The cautionary statements are clear and well-placed.

MCA HELPS

Recently, the Manufacturing Chemists Association recognized that a system of uniform cautionary labeling for all chemicals would be the most effective means of protecting both the consumer and the producer. The Association drew up first, in Manual L-1, general recommendations for the content of cautionary statements on labels, stressing the need for simplicity, brevity and clarity, so that the ordinary shopworker and householder could understand without difficulty. In Manual L-2 a list of suggested wording for labels for specific products is available. As an example of the recommended form and manner of presentation, two labels from this Manual are cited in Figure 1.

The repackager usually receives his shipment with a cautionary label, simplifying the problem of label content for him. When necessary, reference to the MCA manuals mentioned above will be helpful. But the repackager will usually want to adapt the label to the specific market for which his product is intended —whether for technical personnel, shopworkers or housewives. Many questions may be raised usefully in this connection:

Does the label contain all the necessary information?

The label should contain all the information recommended by the MCA, and also any other information required by law.

Is the wording clear?

Words well known to those familiar with cautionary statements may be confusing to the nontechnical person. For example, "Avoid inhalation of vapors" may not mean as much to the layman as "Use where there is plenty of ventilation to avoid breathing vapors." It is advisable, when labeling household products, to consult housewives—at least the members of your family—before deciding upon the wording to be used.

Is the cautionary statement well located?

The user should not have to hunt for the cautionary statement. It should be located where it will not be missed. As a rule the best place for the cautionary statement is close to directions for use.

It is also important that the cautionary statement be placed directly on the container rather than on a carton or circular which may be discarded.

Is it clearly printed?

It is poor practice to print the cautionary statement in type so small that its reading is discouraged.

To illustrate some good and bad examples of labels now on the market:

1. A label on a package of mothproof compound contains all the information required by law. It lists the ingredients by their technical names and it describes antidotes in terms understandable to a physician:

   "Poison: Active ingredients Sodium Arsenite 1.2%. Inert ingredients 98.8%. Total Arsenic (all in water soluble form, expressed as metallic) 0.9%. *Antidote:* Emetic of Mustard, Hydrated Oxide of Iron, a cupful, followed with olive oil or white of eggs. Mucilaginous Drinks, Laudnaum—20 drops—if in pain."

   Unfortunately, this label is much too technical to be of assistance to the housewife. Moreover, there is no mention of the importance of calling a physician.

2. An insecticide label lists the ingredients and says:

   "This solution if brought into repeated or prolonged contact with the skin can cause toxic symptoms. Avoid excessive inhalation and skin contact. In case of spillage on the skin, wash with soap and water. Avoid contamination of foodstuffs. Do not use on household pets or humans. *Antidote:* Call a physician at once. External—Wash with soap and water. Internal—Emetic of mustard."

   This label, though still not too readily understood by an uninformed reader, is a great improvement and carries the important message, "Call a physician at once." Simpler language would be helpful.

3. A dry cleaning fluid label illustrates a cautionary statement well worded but poorly printed and located. The statement reads as follows:

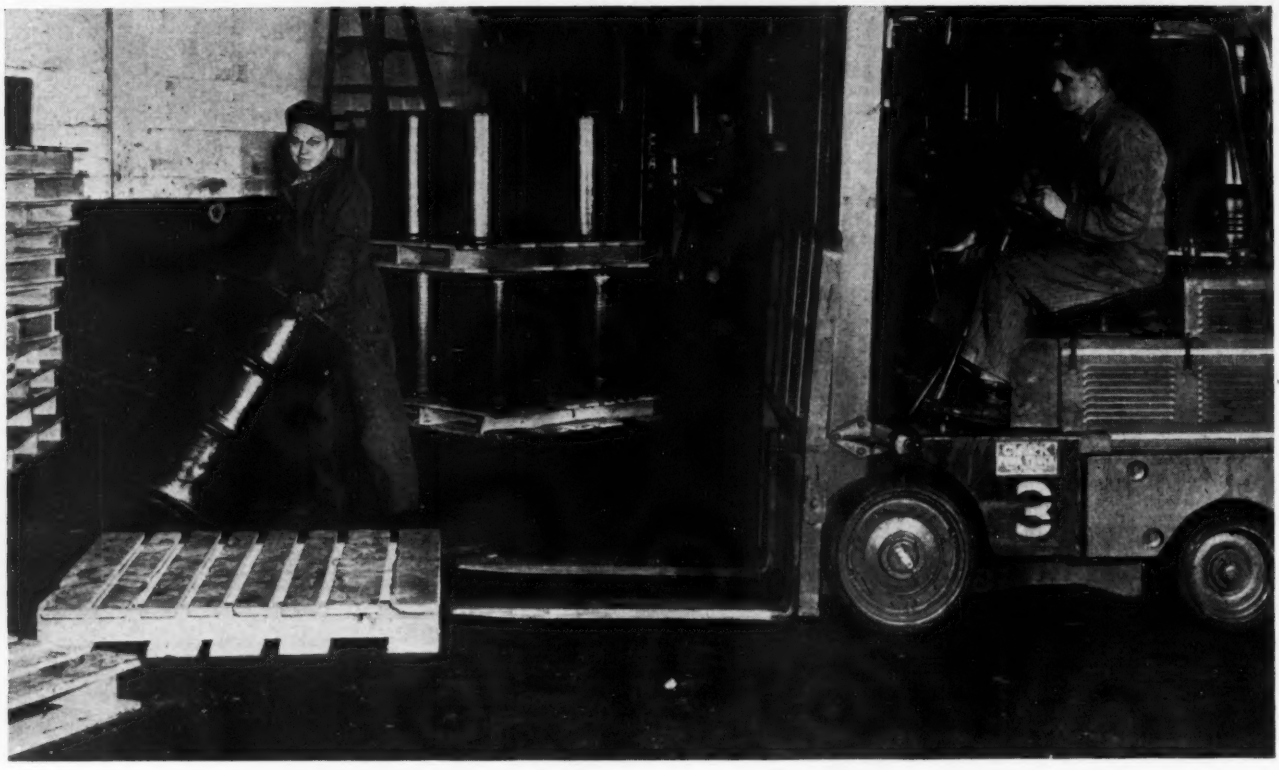
   "Caution: Important. Use only in a well ventilated room or outdoors. Do not use in a closed room. All cleaning fluids have a tendency to dry the skin and in some instances cause a condition similar to sunburn if proper precautions are not taken. We suggest that before using a cold cream or skin lotion be rubbed into the hands and wrists. When finished, wash hands and wrists thoroughly and apply cold cream or skin lotion again. Under no circumstances wear garments before thoroughly dry or permit [product] to come into contact with the body either direct or through clothes, as this may cause irritation to the skin.

   "Avoid cleaning on close, muggy or rainy days."

   Although well stated, this warning is printed in small italics on a very inconspicuous part of the can, not on the same side as the directions for use. It is unlikely, therefore, that the user will see this cautionary statement.

By contrast, two labels of dry cleaning fluids reproduced here (Figure 2) carry cautionary statements that correspond to MCA recommendations and are well placed directly under directions for use.

With a little forethought, and recognition of responsibility, adequate cautionary statements can be combined with eye appeal to produce a label which not only helps to sell the product, but also protects the packager and user.



A good safety floor should be rugged enough to withstand the expected conditions, such as movement of trucks, drums, etc.

How to Select SAFETY FLOORING For Chemical Plants

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SAFETY FLOORS OR FLOOR COVERINGS in buildings where highly flammable gases, liquids or solids are processed or handled, will materially decrease the hazard to persons and equipment. Selection of the proper material for such floors, however, is not a simple matter. It calls for consideration of many factors.

SAFETY floors, for the purpose of this discussion, are floorings or floor covering materials which will minimize the hazard of static electricity and struck sparks.

Static electricity, as is well known, constitutes a hazard and is a problem with many processes and materials. The "struck" or abrasive spark hazard exists with various materials and many types and kinds of equipment. In this article, only static which may be formed on the bodies of persons or on moving vehicles and containers and the sparks which may be struck on or from flooring surfaces are being considered.

Floor surfaces of concrete, steel, or other material from which sparks can be struck or drawn, are a potential source of danger in those manufacturing and processing operations involving flammable solvents, gases, nitrocellulose, and explosives. The actual degree of hazard from either struck sparks or static electricity is unknown, because there is no way of determining accurately the incidence of fires and explosions caused by sparks struck on floor covering surfaces or by static discharge from the bodies of persons, or from equipment or containers being moved across nonconducting floor surfaces. The writer personally knows of a number of cases, however, where it is fairly definite that static electricity caused the ignition of flammable air-vapor mixtures or other flammable materials. No doubt the reader has knowledge of similar incidents.

DEGREE OF HAZARD

Research carried out by the Bureau of Mines during recent years gives a clue to the amount of heat required to ignite vapor-air mixtures and other flammable materials. This reasearch work indicates that a relatively small amount of heat is required for such ignitions, and that this heat can be supplied by the discharge of static electricity which builds up on the body of a person.

A person walking across some nonconductive flooring surfaces can generate a charge having relatively high voltage; also a person wearing garments made of wool, rayon, and possibly other textiles, and sitting on wooden, artificial leather, or other insulating surface, can generate through ordinary body movements, a charge of approximately 10,000 volts.

The capacity of an object, such as a human body, together with the voltage generated, determines the relative degree of hazard.

The Bureau of Mines, in a report by E. M. Cohn and P. G. Guest, that has not yet been published, gives data concerning the minimum amount of spark energy required to ignite flammable air-vapor mixtures of ethyl ether, acetone, and ethyl alcohol. Some of the values are quoted in Table I.

A publication of the National Fire Protection Association, "Fire Hazard Properties of Certain Flammable Liquids, Gases and Solids," lists the ignition temperatures of a large number of vapor-air mixtures, of which several are given in Table II.

TABLE II — IGNITION TEMPERATURES OF VAPOR-AIR MIXTURES

Vapor-Air Mixture	*Ignition Temp.°F.*
Ethyl alcohol[1]	700- 800
Acetone[1]	1000-1050
Ethyl ether[2,3]	356
Acetaldehyde[4,5]	365
Ethyl acetate[1]	800- 925
Butyl acetate[1]	700- 825
Toluol[1]	1050-1125
Butyl alcohol[1]	700- 800
Benzene[1]	1000-1060
Gasoline (C_5H_{12} to C_9H_{20})[1]	536
Butane[6]	1010-1022
Propane[6]	957-1090
Gas, illuminating[4,7]	1094

It will be noted that the ignition temperatures of most of the materials listed are of the same order as the ignition temperature of ethyl alcohol-air mixtures and acetone-air mixtures. The ignition temperature of ethyl ether-air mixtures is lower than that of any material listed above.

1. Underwriters' Laboratories, Inc. Method for the Classification of the Hazards of Liquids, 1929.
2. "Table of Common Hazardous Chemicals," National Fire Protection Assoc., 1939.
3. Underwriters' Laboratories, Inc., Report S1528, "Propagation of Flame in Pipes and Effectiveness of Arresters," 1919.
4. Factory Mutual, "Properties of Flammable Liquids, Gases and Solids," January, 1945.
5. "Fuels and Their Combustion," Haslam and Russell, 1926.
6. "International Critical Tables."
7. "Research Work on the Explosive Range of Illuminating Gas," Underwriters' Laboratories (a supplement to Reference No. 3).

Just how much energy is represented by a millijoule? The heat or energy of an ordinary safety match head when burned is probably 75 to 100 joules. The temperature of such a flame probably ranges from 1500° to 1600° C. (2732° to 2912° F.).

It is, of course, well known that the heat and temperature of a burning match is sufficient to ignite a vapor-air mixture of ether, acetone or alcohol, and probably all other flammable vapor-air mixtures. The Bureau of Mines data indicate that only a very small amount of heat, much less than that given off by a burning match head, is required to ignite some flammable vapor-air mixtures.

Many instances have been reported of the ignition of vapor-air mixtures and other flammable materials by struck sparks. The evidence in many of these incidents is reasonably conclusive that struck sparks caused the ignition.

After considering the foregoing data, it seems essential, for safety reasons, to prevent the building up of static charges on the bodies of persons or on equipment

TABLE I—MINIMUM ENERGIES, IN MILLIJOULES, REQUIRED FOR IGNITION OF VAPOR-AIR MIXTURES OF ACETONE, ETHYL ETHER AND ETHYL ALCOHOL*

% Vapor in Vapor-Air Mixture	Acetone			Ether			Alcohol
	Pure	Sample 2	Sample 5	Pure	Sample 1	Sample 4	Pure
3.00				7.7			
3.37				2.3			
				3.9			
4.00				.49	1.4		
4.25				.52		.48	
4.50	8.9			.53	.48	.48	
4.97	2.4						
	3.3						
5.00				.81	.56	.60	
5.50	1.9	2.8					
5.75			2.1				
6.00	1.4	1.9	1.9	2.1			
6.25			2.1				
6.50	1.4	2.2					1.5
6.52							1.1
7.00	1.5						.43
7.50	2.7						.52
8.00	4.8						

Note that the vapor-air mixtures of all three were ignited by less than 2 millijoules. It is emphasized that the values listed above are minimum amounts of energy required for ignition. Probably the energy of static sparks or arcs is far greater in the majority of cases.

* Used by permission of the Bureau of Mines.

19 QUESTIONS TO ASK IN SELECTING SAFETY FLOORING FOR A CHEMICAL PLANT

1. Is it electrically conductive and nonsparking?
2. Is it strong enough to withstand successfully the expected conditions of service, such as the movement of trucks, loaded drums, and other containers?
3. Is its coefficient of expansion approximately the same as the base material? If widely different, serious cracking is likely to occur.
4. Will it be damaged if some of the product handled or processed is spilled?
5. Will it withstand frequent washing?
6. Can repairs be made readily?
7. Can it be cleaned satisfactorily?
8. Is it manufactured by a reliable concern which will guarantee all claims?
9. Is it relatively nonabsorbent? If absorbent, some of the spilled material will go into the floor and may be objectionable and possibly dangerous.
10. If for use with explosives, is it safe if there should be a spill? With some explosives there is danger of detonation if the material falls on a hard surface. In such cases the floor covering should be tested for safety before a commitment is made.
11. Is the surface anti-skid?
12. Is the surface nondusting?
13. Is the surface comfortable to work on?
14. Is it resistant to common salts, such as sodium chloride and calcium chloride, which might be carried onto the floor surface during the winter months?
15. Will it withstand the expected temperature variations without failure? For example, outside temperature may be sub-zero and room temperature 70° F. or higher, subjecting the material near doors to a wide temperature difference.
16. Is it resistant to lubricating oils and greases, which may leak from equipment and lie on the floor for a considerable period before removal?
17. Is its load-carrying capacity satisfactory? If not, there may be serious indentation by containers, trucks, wheels, or other loads.
18. Is it water resistant?
19. If it is to be applied over "on-grade" concrete, will dampness and alkali which rise to the surface of the concrete damage the floor covering or loosen it? The amount of moisture drawn up through concrete by capillary action can be observed under a rubber mat which has lain on a concrete floor for a few days. This is the moisture which pushes off linoleum, rubber and other impermeable floor coverings which are cemented to "on-grade" concrete. The alkali may disintegrate some floor coverings and adhesives.

and containers at those locations where a vapor-air mixture may exist, or may be expected.

WHERE TO USE SAFETY FLOORING

If the process is one where the material is not exposed or its vapors do not escape to the atmosphere, it does not seem necessary to install nonsparking and conductive floor coverings. To illustrate: A building in which the distillation of flammable solvents is carried out in a completely closed system does not seem to require safety floor coverings, because it would be very unusual for any of the materials to escape to the room or building air. It is true that leaks may occur occasionally, but they should be infrequent and promptly corrected in a properly operated plant.

On the other hand, there can be a frequently repeated step in a process where a hazardous condition is set up. For example, a flammable material such as nitrocellulose is charged into a dissolver or mixer, and flammable solvents are used. Again, when the finished material is drawn into containers (usually open ones), flammable vapors may be released out into the room. There are many manufacturing operations where flammable vapors do or may escape.

The accumulated evidence, based on many years of experience, indicates that for processes involving the handling of volatile flammable materials or of very highly flammable non-volatile materials such as nitrocellulose, the floor covering material should be of the safety type.

The floor slab may be of concrete or other suitable structural material, which may be required for reasons of design, but the wearing or working surface should be both nonsparking and electrically conductive.

Fortunately, several floor covering materials are available which meet this requirement. Care and caution, however, should be exercised in selecting a nonsparking and conductive floor covering material for a specific installation. To those who have little or no experience with safety floor coverings, it may seem a relatively simple subject, but actually it is rather complex. Some of the factors to be considered in selecting a conductive and nonsparking floor or floor covering which will be successful are listed on page 415.

If the answers to these questions are reasonably favorable, then the floor covering has a chance of being successful. However, before any large scale installation is made, it will be advisable to make a trial installation of a reasonable area at a location where the most severe service is expected. This recommendation is based upon long experience with many kinds and quantities of floor covering material, and is believed to be the soundest course to follow.

Another important factor is the proper laying of the floor or covering. All of the requirements of a good material may be met, but if it is applied improperly or under adverse conditions, the job may be unsatisfactory or perhaps even a complete failure.

The contractor or the mechanic who puts down the conductive and nonsparking floor covering materials should be thoroughly experienced in such applications; furthermore, the flooring should be put down in strict accordance with the manufacturer's specifications.

Too great emphasis cannot be placed on the following items: the design of the sub-floor; the finish of the sub-floor to receive the floor covering or surfacing material; the control of the temperature in the room or building; the thickness applied; the temperature proportioning and actual application and working of the material.

A floor covering material may be satisfactory in one plant, but the conditions of service in another plant may not be identical; therefore, it is advisable to proceed cautiously before making a commitment for a large amount of material.

HOW FAR SHOULD IT EXTEND?

The question will be raised concerning how far or to what extent nonsparking and conductive floor covering material should be applied. Such floor coverings should be placed so that body static or static from containers or other objects will be grounded a reasonable distance from the zone where a flammable vapor-air mixture can be expected.

If the conductive and nonsparking floor covering material starts near the place where a flammable vapor-air mixture might be expected, then as a person approaches that zone with his body carrying a charge, he will be grounded as he steps from the nonconducting surface to the conducting surface, and an electrical discharge can occur. If a flammable vapor-air mixture should be present, ignition might occur.

Occasionally, copper or other nonferrous metal strips are applied to floor surfaces, spacing such strips a few feet apart. This is done to provide a path to earth for static charges. Such a design is open to the objection just raised; a spark can occur as a charged person, container, or vehicle touches such strips.

Another point to keep in mind: The shoes worn by persons working near or around flammable vapor-air concentrations or other highly flammable material should have reasonably good conductivity. Shoes with conductive soles are available from several manufacturers. Such shoes should drain to earth continuously any charge which tends to form on the wearer's body, if the floor surface is conductive. If the soles are nailed, the nails should, of course, be made of nonsparking metal.

Old shoes which have been more or less saturated with perspiration can serve as satisfactory conductors; their resistance to earth is usually low enough to cause continuous discharge while the wearer walks on a conductive floor covering material. New shoes soled with leather and any kind of shoes sold with nonconductive rubber or other nonconductive material should not be permitted in areas where static is a hazard.

Another item of importance is the kind and type of furniture, such as benches, stools, and chairs. It is important to avoid those made of wood or other insulating materials. The stools and chairs preferably should be all metal, and if they are equipped with casters these also should be made of nonsparking and conductive material. Any benches or tables should have conductive tops or working surfaces grounded or bonded to the conductive floor. Such objects should have a resistance to earth approximately the same as the resistance of the conductive floor to earth.

The question probably will arise concerning the resistance to earth of conductive floors. If a conductive floor covering material makes contact with a sprinkler riser or other good conductor, which is well grounded, no other earth connection is needed.

If there is no such ground, it will be advisable to place one or more substantial grounds, so that the floor will have a resistance to earth of about 100,000 ohms. This is a suggested minimum value. Various values have been suggested up to one megohm (1,000,000 ohms). These higher values may be satisfactory in draining static to earth continuously; however, a 100,000 ohm resistance is not at all diffcult to obtain, and it is believed that a resistance of this order is reasonable and desirable.

A low resistance (of a few ohms) to earth is not needed; in fact a low resistance may be dangerous, as it does not provide protection against possible shock from electrical circuits. With a resistance to earth of 100,000 ohms or thereabouts, the current which can flow through a person's body is not enough to cause a serious shock.

WHAT MATERIALS?

Consideration may be given to the use of nonferrous metal floor covering materials, such as copper, aluminum, or lead. Such surfaces have merit; however, it is difficult to successfully apply metal floor coverings, and the chances are against their giving satisfactory service. It is difficult to fasten them down and keep them securely fastened. The fastenings should be flush. This means countersunk heads and probably welding or fusing around the head to prevent traps or lodging of any spilled material.

There is also the difficulty of keeping the surface continuous, because expansion and contraction may result in the

The resistivity between two points on a safety floor is being measured with a "Megger." Resistance to ground would be measured by grounding one of the leads.

cracking of the metal. This offers the possibility of some of the material under process getting trapped between the covering and the base. There are dangers and difficulties in making repairs; if the process involves flammable material, it is not safe to use welding torches without shutting down the process and cleaning out the building, which is time consuming and expensive. Another objection to metal floor coverings is their low electrical resistance, the undesirability of which has already been discussed.

Consideration should be given to floor covering materials such as conductive linoleum, conductive rubber, conductive asphalt tile, bituminous mastic made conductive, carbon brick or blocks, specially prepared iron particles incorporated into the wearing surface of concrete, magnesium oxychloride compositions which have been made conductive, and possibly other materials. All of these have a field of usefulness.

Conductive and nonsparking floor covering materials other than those mentioned in this article no doubt will appear on the market from time to time, and it will be advisable to investigate such materials in the light of the specifications given on page 415 and the service requirements of each specific installation.

Wood floors meet the requirement of being nonsparking if nonferrous fastenings such as copper, brass, etc., are used, but any wooden floor covering material as ordinarily supplied will not be conductive, so wood does not eliminate the static spark hazard.

Some thought may be given to the use of conductive and nonsparking coating materials, to be applied to the floor surface by brushing, mopping, spraying, etc. Such coating materials can be made and used; however, the films will generally be very thin, and will not have much resistance to wear and abrasion. The amount of service to be expected would depend, of course, on conditions at each location, but it is doubtful if such films are serviceable enough for most industrial applications.

PLASTIC SURFACING

It is believed that a nonsparking and electrically conductive floor covering material which can be applied in plastic form to either wood or concrete surfaces as a monolithic surfacing is the indicated type of material for many industrial applications. Such materials can be put down at the time the floor is placed originally, or they can be placed on old floors of either concrete or wood without causing serious inconvenience.

In applying conductive floor covering material to wooden floors, care should be taken that there is no serious amount of spring, deflection, or vibration. If there should be serious spring or deflection, cracking of the covering can occur, resulting in either an unsatisfactory floor or complete failure. Marked vibration might also cause failure. On the other hand, a wooden floor of sufficiently rigid construction which is not subjected to serious vibration can be used satisfactorily for supporting a monolithic conductive and nonsparking floor covering material.

The monolithic floor covering material should be applied in a relatively thin layer to avoid any marked difference in the floor level of adjoining rooms, which might affect the movement of containers, trucks, or other equipment used for moving packages or containers. The materials now available can be applied in thicknesses of about ⅜" to 1", and usually such a thickness should not cause any serious inconvenience in existing buildings. The floors or floor covering materials referred to above will retain their conductive and nonsparking properties for the life of the material.

The length of service to be expected will vary, depending usually upon the amount and kind of service. It is reasonable to expect, under the average conditions which will prevail in the majority of manufacturing plants, that conductive and nonsparking floors will give the years of satisfactory service one is entitled to expect.

It will be advisable to check the resistance of the floor to earth from time to time, as the ground connection may be removed accidentally or make poor contact because of corrosion, cracking, etc. This can be done by using a "Megger" ground tester (see illustration) or other suitable instrument, placing one electrode on the floor and the other on the earth or ground. The electrode should exert a pressure of 5 pounds uniformly over an area of 5 square inches. A conductive "electrode jelly" should be spread on the electrode to insure positive contact with the floor surface (without increasing the area of contact). The resistance between the electrode and building ground is measured by an ohmmeter capable of maintaining a voltage of not less than 90 volts nor more than 500 volts across a resistance of one megohm. The resistance so measured for any position of the electrode on the floor should not be more than 250,000 ohms.

The installation of safety floors or floor covering materials (that is, floor surfaces which are nonsparking and electrically conductive) in buildings where flammable solvents are used, or gaseous process operations are carried on, or where other highly flammable materials are processed and handled, will materially decrease the hazard to persons and to the operations.

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The airplane dusting of orchards and cotton fields with benzene hexachloride dusts has yielded some interesting pest control data.

BENZENE HEXACHLORIDE

Promising British Insecticide Takes Hold Here

EDITORIAL STAFF REPORT

EMERGING FROM THE PILOT-PLANT stage to large-scale production, benzene hexachloride is destined to become a major tonnage item, for its insecticidal properties are unique, its raw materials normally cheap and plentiful, and its potential field of application almost unlimited.

NOT SINCE the discovery of the insecticidal properties of DDT has any new insecticide attracted so much attention as benzene hexachloride. And few appear to face a more promising future. A short time ago there were many who questioned the value of the new toxicant, particularly in view of the variable results recorded in early field tests. But now the worth of BHC has been established and heavy commitments are being made for the construction of full-scale producing units.

For this unique compound, variously called benzene hexachloride, hexachlorocyclohexane, HCCH, 666, Gammexane, or, more precisely, 1,2,3,4,5,6,-hexachlorocyclohexane, kills insects unaffected by many other insecticides. And one major advantage is its versatility. It functions not only as a stomach and contact poison but also as a fumigant. Thereby BHC can be used as an ingredient of dusts or sprays, or volatilized as a direct fumigant. Significantly too, the raw materials from which it is made—chlorine and benzene—are normally plentiful and inexpensive—a factor which greatly enhances its commercial prospects.

As yet U. S. output has been comparatively limited. But several major projects are scheduled for this year. Too, field test results are still classified as "preliminary," but this summer will see many extensive testing programs designed to evaluate more completely BHC's insecticidal worth and appraise its potentialities.

HOW IT WAS DEVELOPED

There has been some controversy as to when the insecticidal properties of BHC were first discovered. As a compound it was prepared by Faraday in 1825, but, somewhat like DDT, it apparently remained on the shelf as an uninteresting chemical until 1941. In that year a French experimenter noticed that BHC was toxic to clothes moths and suggested that it be evaluated as an agricultural insecticide. The earliest published report was released in France in November, 1943, but it did not reach the U. S. until early last year.

Actually, American attention was first focused on BHC when Dr. Roland Slade of Imperial Chemical Industries Ltd. outlined its properties in the course of delivering the Hurter lecture in March, 1945. Dr. Slade placed British discovery of the toxic worth of BHC as early in 1942—at a time when stringent war regulations prohibited publication. He also pointed out that the gamma isomer of benzene hexachloride was evidently the valuable constituent of the commercially prepared product, and indicated that the insecticidal worth of the other isomers present appeared to be minor. Most U. S. work on BHC began after Dr. Slade's revelation.

HOW IT IS MADE

Benzene hexachloride is quite simply prepared by the chlorination of benzene in the presence of actinic light. This reaction proceeds smoothly with the reactants present in the approximate ratio of 3 moles of chlorine to one mole of benzene. The normal product contains some 10-12 per cent of the desired gamma isomer, as well as varying percentages of at least four other isomers, which have been designated as alpha, beta, delta, and epsilon.

One objective of all experimenters has naturally been to up the yield of gamma relative to the other comparatively inert

isomers. Some progress has been made in this respect, and a process reported recently, which embodies the use of dilute caustic during the chlorination reaction, is claimed to give a gamma yield of 42 per cent, with the balance composed of other isomers and smaller amounts of higher chlorinated cyclohexanes. Several manufacturers have filed patent applications on other process modifications too, but they are quite naturally chary of revealing any details.

An important point, often unrecognized, is the difference between benzene hexachloride and hexachlorbenzene. The former is an addition product, $C_6H_6Cl_6$; the latter is the substitution product, C_6Cl_6, and has no value as an insecticide.

There are, of course, basically two paths which the benzene-chlorine reaction can follow, dependent upon temperature, catalysts, and so forth. In the presence of aluminum chloride, for instance, the substitution products are formed, namely, monochlorobenzene, dichlorobenzenes, and the end product, hexachlorobenzene. The other reaction, and the one utilized to make BHC, is the addition reaction. Although the specific chemical name for BHC is 1,2,3,4,5,6,-hexachlorocyclohexane, benzene hexachloride is the term which has been most widely used—for the sake of convenience. (The designation "666" originated in England, as a derivative of the formula $C_6H_6Cl_6$, but it has been virtually abandoned in the U. S. in view of the fact that it had previously been registered as a cough syrup trademark.)

An interesting point is that BHC contains 73 per cent chlorine and is the product of a simple, one-step process. DDT on the other hand has less chlorine (50 per cent) and more processing. The eventual cost of BHC, then, is more closely tied to the cost of chlorine than is DDT.

It is not surprising therefore that several major chlorine producers are manufacturing, or planning to make, BHC. Among these are Pennsylvania Salt Manufacturing Co., Westvaco Chlorine Products Corp., Dow Chemical Co., E. I. du Pont de Nemours & Co., Inc., and Hooker Electrochemical Co. Other companies prominent in the field are Commercial Solvents Corp., John Powell & Co., Inc., J. T. Baker Chemical Co., and General Chemical Co. Inc. Several other concerns are laying production plans but have not as yet officially revealed their intentions.

As produced crude BHC has a strong, musty, persistent odor, but several procedures have been developed to improve the odor of the refined product. Manufacturers are not prone to talk of their processing techniques, but it is apparent that a method which could be employed would involve the use of organic solvents and deodorizing adsorbents. As yet, the exact cause of the high odor level of BHC has not been determined—a fact which has impeded odor-improvement progress. However research men believe that the presence of heptachloro compounds, or a high acidic content, are contributory factors.

The pure gamma isomer itself has a slight odor, but not nearly so disagreeable as that of the crude material. That the odor of BHC can be improved has been established; whether it can be eliminated is still a question. Needless to say, the problem of odor minimization is high on the research priority list, for all manufacturers appreciate the sales advantage to be gained through odor improvement.

It should be mentioned too that the percentage of the several isomers in BHC, as marketed, can vary considerably, dependent upon the refining technique used. This is not in itself overly important, however, because BHC is sold on a gamma content basis—for it is the gamma isomer only which has any appreciable value as a toxicant.

Grades containing 10 to 12 per cent gamma are on the market and some materials of 20-30 per cent may soon be offered in quantity. Small lots of 95 per cent purity have also been made, and whether a product of this purity will find a place commercially is still debatable, for in virtually all cases BHC of lower gamma content will meet compounders' needs. All grades of BHC can be formulated into dusts, water-dispersible powders, and emulsions, by the selection of compatible diluents, wetting agents, and spreaders.

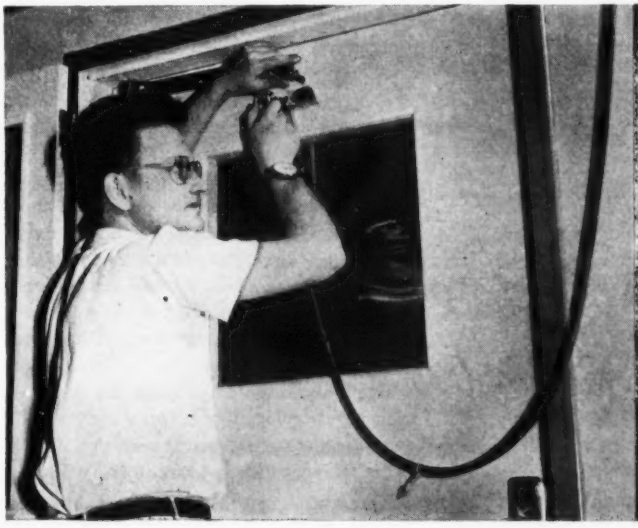
Of some significance is the patent situation. Among the more important issued is the Bender patent (U. S. 2.010,841), filed in July 1933 and issued Aug. 13, 1935. Assigned to The Great Western Electrochemical Co—a subsidiary of Dow Chemical Co.—it includes mention of the insecticidal properties of benzene hexachloride. Others include: British patent, 447,058, issued May, 1936 to H. F. Stephenson and A. L. Curtis; British patent 504,569, issued April, 1939 to A. E. Grant; and U. S. patent 2,218,418, granted to Thomas Hardie (Imperial Chemical Industries Ltd.) on Oct. 15, 1940.

The foregoing are patents published to date, but it is known that many other applications for protection have been filed. The actual status of patent rights can be clarified by time alone.

WHAT IT WILL DO

The original investigations conducted in England on BHC were initiated in an attempt to find a substitute for derris, and in the course of their work British experimenters found that BHC served as an excellent agent for the control of the turnip flea beetle. Later too they discovered that it held promise for combatting cereal pests—such as the grain weevil. In a concentration of one part of gamma isomer per million parts of wheat BHC exterminated the destructive weevil, and no taste was detectable in the flour or bread subsequently made from the treated grain.

However, early experiments did not yield consistently good results. In some field tests the rate of kill was remarkable;



Laboratory tests have revealed that BHC is some 8 times more toxic to houseflies than DDT. Major disadvantage: its odor.

Courtesy Du Pont Co.

Testing BHC as a codling moth agent. Apples are sprayed, dried, and moth eggs deposited on them for subsequent hatching.

in others it fell far short of expectations. Too often results varied widely and were not reproducible.

It soon became evident that such erraticisms in performance were due to variations in the content of gamma isomer. But it was not easy to determine the percentage of gamma in batches of BHC. Initially biological tests had to be run on each batch to obtain a proximate measure of gamma present. Since then infra-red spectrophotometry techniques have been utilized, but the development of this method of isomer analysis has been retarded by the limited availability of equipment and skilled operators. More recently it has been reported that the gamma isomer, alone, has the unique property of inhibiting the growth of one strain of yeast, and it is suggested that this fact may be exploitable for gamma isomer assay purposes. At present, both biological testing methods and infra-red spectrographic analysis are used to determine the gamma content of BHC. The creation of adequate assay methods was one of the major accomplishments in the development of BHC.

The fact that BHC functions as a stomach poison, contact poison, and fumigant, is one of its prime assets. That it is also stable in acid and at high temperatures, is practically insoluble in water, yet readily soluble in many organic solvents, broadens its field of application. Its odor, and incompatibility with alkaline materials, are restricting properties.

As far as toxicity to humans and warm-blooded animals is concerned, it has been fairly well established that the gamma isomer is the most toxic of the five isolated to date, and that hte crude BHC is less hazardous from a toxicological standpoint than DDT. Laboratory rats fed 10, 20, and 30 mg. of gamma isomer per kilogram of body weight, over a 27 day period, were unharmed. However, oil-base sprays of 3 per cent gamma did kill rats after 11 days exposure.

There is obviously a definite need for more work to be done toxicologically before a final statement can be made. Nevertheless, present indications are that it is improbable that such residual quantities of BHC as might remain on foodstuffs under conditions of ordinary application will present any hazard.

FIELDS OF PROMISE

Perhaps the largest potential market for BHC, and the field which holds most immediate promise, is in combatting cotton pests. Hitherto there have been several insecticides which have been used with some success to control several cotton insects. But BHC has yielded particularly encouraging results in the eradication of such insects as the boll weevil, aphid, leaf hopper and leaf worm. When applied at the rate of one-half pound of gamma isomer per acre it serves as a potent control agent. However, it appears to be less effective against the bollworm than either DDT or the arsenicals, and is ineffective against the red spider. But a combination of BHC and DDT can eliminate almost all major cotton pests. The potentialities of this market and its economic significance can readily be visualized.

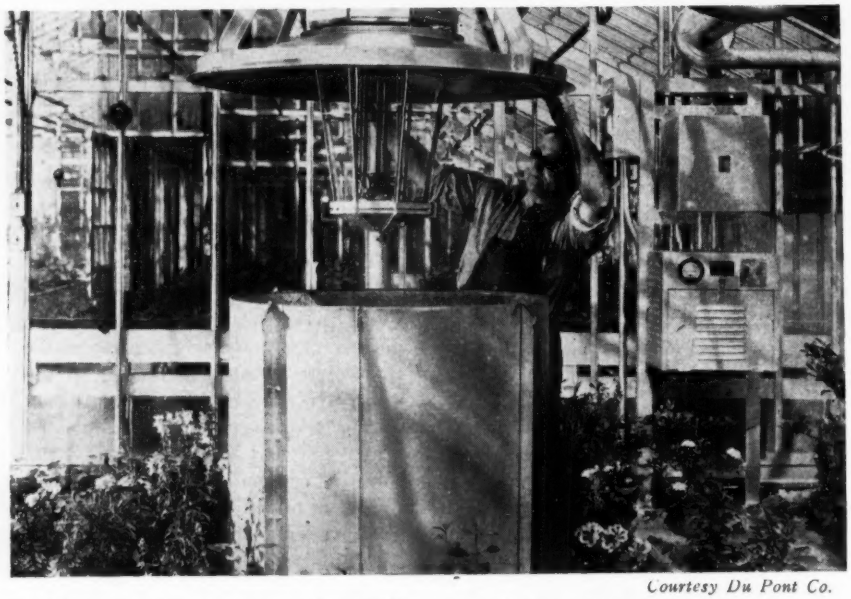
Dust applications of BHC have also yielded encouraging results in ridding garden crops of many destructive pests. Among these are the corn ear worm, corn borer, squash bug, cucumber beetle, onion thrips, asparagus beetle, spinach flea beetle, potato and Mexican bean beetle, and some insects attacking tomatoes. It should be mentioned, however, that these experiments have been but preliminary, and in a few cases some leaf-burning was observed and some trouble with "off-flavor" fruit was encountered.

Last year too, substantial quantities of BHC were shipped to Sardinia to combat a locust plague, and results were outstanding. Similarly, BHC appears to be a promising agent for curbing grasshopper depredations, although some other new insecticides are claimed to possess somewhat superior qualities.

Benzene hexachloride is some eight times more toxic to houseflies than DDT, with entomologists reporting that 12 mg. of gamma isomer per 100 c.c. of solvent is equal to 100 mg. of DDT per 100 c.c. of carrier. However it is relatively slow-acting, and is considerably less persistent than DDT as a residual agent. Too, there is a serious drawback to the use of BHC as an ingredient in household fly sprays; its odor, although much improved, is quite strong and extremely difficult to mask. Some BHC spray is being sold in England and France, but it is highly improbable that such products would gain consumer acceptance in the U. S. Some makers regard BHC as in the same category as the thiocyanates were some ten years ago—when they too suffered from an odor disadvantage which has been long since conquered.

One feature of importance in the field of fly control is the toxicity of BHC to fly larvae. There is a distinct possibility that it may find a use in the periodic treatment of manure piles, garbage, etc., and contribute materially to larva eradication. It is also useful in killing cattle lice, ticks, hornflies, and chicken lice, and serves as an efficacious carpet beetle and moth control agent.

Among the more intriguing applications of BHC is as a soil fumigant. Few insects have been more difficult to kill than those which infest, or spend a part of their life cycle in, the soil. Yet when BHC is applied at the rate of about 5 pounds of crude material per acre, and disced or drilled into the top soil, effective control of such insects as the wire worm, which attacks potatoes, and the Japanese bettle grub are realized. Several fertilizer manufacturers are eyeing BHC as a material they might incorporate in some special fertilizers.



Courtesy Du Pont Co.

Particular attention has been paid to BHC as an agricultural insecticide. It can be volatilized from a hot plate as a fumigant. Blended in the soil, it kills many field pests.

PROSPECTS

By and large BHC will not compete with DDT; rather it will serve mainly as a supplement. Yet in some respects it will compete with other insecticides. There are fields, for instance, in which it will enter into direct competition with the arsenicals, mercurials, nicotine derivatives and sodium fluoride. But in other cases it will be used in conjuction with other insecticidal products.

The experiments conducted to date have been only exploratory because only small quantities of BHC have been available. But this year much more work will be done.

And before too long the shape of things to come will be even more clearly discernible.

How to Increase RESEARCH PROFITS

EDITORIAL STAFF REPORT

RESEARCH PAYS HANDSOME PROFITS, but today, new projects are accumulating faster than they can be developed. In some respects research techniques are inadequate for handling today's load. Here is one new method for stepping up both the quality and quantity of process developments that is finding growing use in several large industrial research laboratories. It speeds research and helps assure the results.

RESEARCH is the exploratory function of business that deals with the uncharted future. In its quest for new ventures that will bring profits to the business, research naturally runs up many dead-end streets and often finds rather barren fields at the end of initially promising trails. Still research pays off handsomely when it finds success. While the percentage may be low, the stakes are high.

The problem is not whether to do research, but rather how to increase the percentage of successes—how to raise the stakes. In the past its successes have often been counted just the commercial realization of any of its ventures. Today there are some who believe that there are degrees to research success—degrees gaged by the extent of the profits it brings and by the speed and efficiiency with which research arrives at its profit goals.

Several progressive industrial research laboratories are now exploring new techniques for setting the odds on research more in their favor. In these organizations each new proposal is tested for its ultimate business potential before any experimental work is begun. Each new development problem is viewed from all the possible ways of solving it. The welter of possibilities is sifted to eliminate all but the one or two alternatives that promise the greatest profit. Experimental work is reserved only for the processes that have the highest potential.

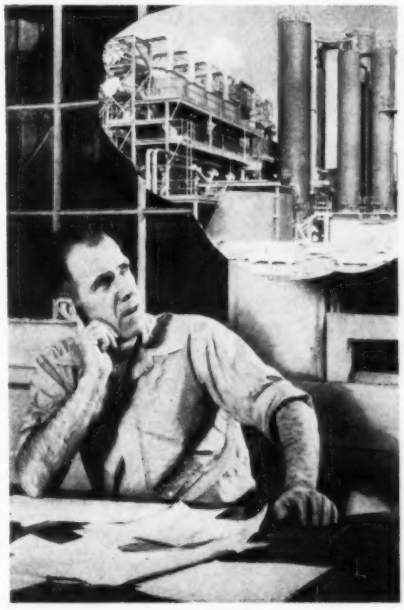
The practitioners of this new technique claim that it results in the development of more efficient plants with less expenditure of research time and money.

WHAT IS THE METHOD?

The technique for sifting chemical process alternatives is an adaptation of the businessman's methods of forecasting and budgeting. Essentially it is a visualization of embryonic chemical processes in terms of commercial plant economics. It operates entirely on paper, starting with the basic chemical equations and ending with estimates of plant construction and operating costs. An example of a typical summary of pre-laboratory process evaluation is shown in chart reproduced here. A separate evaluation like this one is made on each alternative process. A comparison of the operating and construction costs for all the optional processes makes possible the selection of the one or two prime processes for actual experimental development work.

HOW EVALUATIONS ARE MADE

The method of pre-laboratory evaluation is too new to have resulted in any rigidly prescribed procedure as yet. But there is a pattern to the work dictated by the sequence of steps required. The three phases of the job are: the preparation of a schematic plant flow-sheet; the estimation of costs; and, the summary of the results.



The essence of the method for the pre-laboratory evaluation of research projects is the visualization of the embryonic chemical process in terms of commercial plant economics.

The first step is usually the work of a chemist and a chemical engineer. Starting with the proposed chemical reaction equations, they calculate, or estimate, the yield, conversion, by-products, temperatures, pressures and such basic process factors. From these they compute material and heat balances. Then the equipment requirements are estimated and the schematic flow-sheet is drawn. Estimates of steam, water, electricity and labor requirements are also incorporated in the flow-sheet.

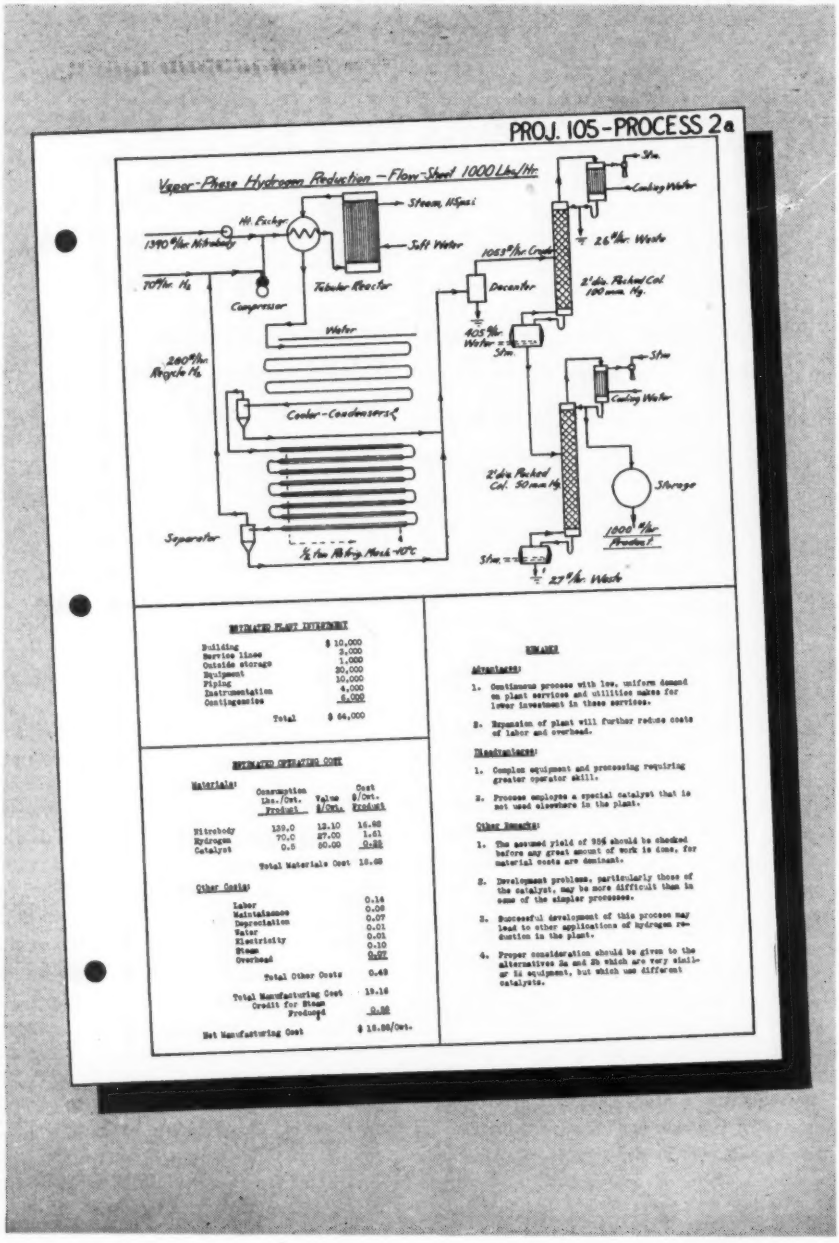
This first phase of the job is the most critical for it must be complete, realistic and in sufficient detail to permit cost estimating. It involves theoretical chemistry and engineering design. Essential also is an understanding of chemical plant operations, and a broad knowledge of process equipment. The value of the final figures depends upon how well the evaluators have anticipated the process conditions and upon the practicability of the solutions they have proposed.

At the second phase of the pre-laboratory evaluation the chemist and engineer call on other specialized personnel to assist in checking their flow-sheet from a plant operating point of view; to obtain construction cost estimates; and to prepare estimates of the operating cost.

The final phase of the job is two-fold. Each of the individual alternatives must have a summary and the entire group of alternatives must be abstracted. The two jobs are quite different. That for individual processes should include remarks as to which assumptions used in the calculations are most critical, which may be the most doubtful; what the advantages and disadvantages of the process are with respect to health hazards, operating difficulties, development problems, ease of expansion; and, such factors as are not shown by the figures themselves. The overall abstract is usually a brief report recommending laboratory investigation of one of the proposals and showing why this one is selected in preference to the others.

WHAT THE BENEFITS ARE

Those who have tried pre-laboratory cost analysis in planning research work have found three major benefits from it. First, it makes for the development of more economical plants. Second, it conserves valuable research time and man-


PROJ. 105-PROCESS 2a
Vapor-Phase Hydrocarbon Production - Flow-Sheet 1000 Lbs/Hr.
Steam, 115psi
Soft Water
Tubular Reactor
Compressor
Water
Cooler-Condensers
Separator
Decanter
Cooling Water
Storage
Product
Cooling Water
Steam
Steam
Water
Water
Water
ESTIMATED PLANT INVESTMENT
Building $ 10,000
Service lines 2,000
Outside storage 1,000
Equipment 20,000
Piping 10,000
Instrumentation 4,000
Contingencies 6,000
Total $ 64,000
REMARKS
Advantages:
1. Continuous process with low, uniform demand on plant services and utilities makes for lower investment in these services.
2. Expansion of plant will further reduce costs of labor and overhead.
Disadvantages:
1. Complex equipment and processing requiring greater operator skill.
2. Process employs a special catalyst that is not used elsewhere in the plant.
Other Remarks:
1. The assumed yield of 92% should be checked before any great amount of work is done, for material costs are dominant.
2. Development problems, particularly those of the catalyst, may be more difficult than in some of the simpler processes.
3. Successful development of this process may lead to other applications of hydrogen reduction in the plant.
4. Proper consideration should be given to the alternatives 2a and 2b which are very similar in equipment, but which use different catalysts.
ESTIMATED OPERATING COST
Materials:
Nitrobody 139.0 12.10 16.88
Hydrogen 70.0 27.00 1.81
Catalyst 0.5 80.00 0.40
Total Materials Cost 19.08
Other Costs:
Labor 0.14
Maintenance 0.09
Depreciation 0.07
Water 0.01
Electricity 0.01
Steam 0.10
Overhead 0.07
Total Other Costs 0.49
Total Manufacturing Cost 19.16
Credit for Steam Produced 0.08
Net Manufacturing Cost $ 19.08/Cwt.

Estimated plant cost figures for each alternative process are summarized in a manner similar to that shown on the above form. A comparison of the summaries for all of the process options permits the selection of the one best alternate for actual laboratory development.

power. Third, it minimizes the expense of research investigations. In some cases it provides a valuable guide to the laboratory work itself.

It's hard to prove the advantages of pre-laboratory calculations by any "before and after" comparison because no two research projects are alike—and none has been done with and without the benefit of preliminary economic studies just to prove the difference. The best evidence of success is the actual performance reported for several recent cases.

How more efficient plant processes result from preliminary cost studies is shown by a case in which the study was made, but its recommendations ignored. In this case the economic studies showed real promise for one particular process, but those in charge of the research declined to investigate this alternative on the grounds that it probably wouldn't work anyway. The development proceeded on one of the less profitable options and a multi-million-dollar plant was built. Within a few months after the plant went into operation a major portion of it was revamped to achieve the economies indicated in the previously rejected process. Needless to say the cost of plant alterations far exceeded the research costs.

In another case a large-scale chemical development went through the laboratory in a very short time. There were 27 alternative processes proposed for making a single product. Four weeks work on cost estimation showed that one of the proposals had a far greater profit potential than any of the others. This process was chosen for experimental development in the laboratory. In less than six months laboratory work was completed and a pilot plant was being built. The processes in this case were quite complex: there were four or more reaction steps, and, from two to five physical operations.

Costly duplication of laboratory test work was avoided in a third case. Here the problem was two-fold. First, was the product itself profitable to produce? A previous market study had set the probable relationship between price and volume of sales. Second, which of three processes should be employed? The preliminary economic evaluations, done in three weeks, covered all three processes, each at three rates of production, and for both batch and continuous operation. It was shown that one of the alternates was economically favorable at production rates over two tons per day, if the process could be worked out for continuous operation. Experimental investigation of only one process represented a particularly great saving in research expense. The product found its chief use in applications in the manufacture of dye intermediates. The nature of its use was such that only application testing would prove its utility. Since application tests were both time-consuming and costly, it was important to minimize the number of alternates.

The conduct of the laboratory research is often aided by these cost studies. Process variables that are most critical from a cost aspect show up in the figures and indicate that these factors should be verified early in the experimental work before large sums are committed to the project. In one interesting case two processes appeared about equal in overall economy, but one used cheap raw materials and a high plant investment, while the other employed rather costly materials with a simple plant and small investment. In the one, conversions, reaction rates and physical operations were all important; in the other, yield was the determining factor. Both were given some preliminary laboratory exploration before the low-investment process was finally recommended.

The proponents of pre-laboratory economic studies believe that the objective of research should be, not only to find "a way", but to find "the one best way" of producing new chemical products. While there are no real opponents of the system itself, there are some research executives who feel that economics should be kept out of research—that research finds "a way" and it's up to somebody else to carry on from there. Few question the value of seeking the most expeditious development of the most economical plants. It's all a question of where cost reduction efforts should start. The advocates of pre-laboratory calculations say that the best time to save money is before you have spent it. They point out the waste resulting from the considerable number of plants that are obsolete before they are ever built.

Formulation of SPOT CLEANERS

by IRVING REICH,
Foster D. Snell, Inc., New York

THE PACKAGING AND MARKETING of spot removing and dry cleaning fluids can be a profitable specialty business. But trends in formulations and other fundamental matters must be fully considered if the production of a competitively satisfactory compound is to be assured.

ORDINARY textiles of which clothing, curtains, upholstery fabrics, and such are made, are almost ideally designed to accumulate and hold soil of all kinds tenaciously. The meshed structure of such materials favors both the capillary wetting of interior fibers by fluid soils and the entrapment of solid particles. Too, their immense fiber surface area and high sorptive affinity—which are basic factors in the dyeing industry—foster the unesthetic dyeing of local areas by such agents as greases, inks, and fruit juices.

Major industries exist, of course, devoted solely to the separation of grime from fabrics. Generally textiles made from vegetable-derived fibers—such as cotton and linen—are easily cleaned by being washed in water to which soap or some synthetic detergent has been added. However, most animal-derived fabrics—such as silk and wool—cannot be effectively washed in water solutions without danger of shrinkage, warping, or staining. They are ordinarily "dry cleaned"—that is, rinsed in organic solvents.

Very often, however, an otherwise clean fabric may acquire a spot which it is desired to remove at home without washing or dry cleaning the entire garment. The most obvious recourse is to water, but this may be unsatisfactory, either because the fabric is spotted by water, or because water—even with detergent present—does not effectively remove the stain. For quite frequently the spot is what professional cleaners term a "grease spot." The removal of such blemishes, and the home dry-cleaning of small garments such as gloves, is the function of specialty cleaning fluids.

THE TARGET

The ideal spot removing preparation would have to meet a rather imposing list of requirements. It should readily remove stains of all types, including oils and greases, resins, as in paint or chewing gum, water-solubles such as sugar syrups, insoluble pigments, such as soot and dust, proteins, such as egg and blood, and adsorbed dyes as in inks. Particularly so in that most stains, for instance, gravy, lipstick, crayon, mustard, and shoe polish, are composite.

The ideal remover should be non-toxic, non-flammable, inert toward ordinary fabrics and fabric dyes, colorless, and chemically stable. It should not have an unpleasant odor. It should not attack metal, since it would probably be sold in a metal container. It should evaporate rapidly after application, but not so rapidly that many other successive applications are necessary. Finally, it must be readily available at a low cost.

A spot remover meeting all these requirements fully has never been formulated, and almost certainly never will be. It is the target at which to shoot.

WHICH SOLVENTS ARE USED

Some few years ago gasoline was widely used by housewives for spot removal and dry cleaning in the home. That its use is extremely dangerous is well known, but perhaps not properly appreciated even yet. Ordinary naphtha is not much safer.

The most popular hydrocarbon cleaning solvent and spotting fluid is Stoddard solvent. This is an aliphatic hydrocarbon cut having a boiling range of 150°-200° C.—that is between the low flash naphthas and kerosene. Its flash point of about 40° C. (100° F.) makes it reasonably safe insofar as ignition of vapors is concerned. It will, of course, burn if ignited by direct contact with a flame. Stoddard solvent is less toxic than any other common cleaning fluid.

It suffers from two major disadvantages, however. Its slow drying rate is a sales deterrent, and an odor which can only be driven off by applying heat may be left in the garment. This odor problem is not serious if the solvent has been properly made.

Carbon tetrachloride has been marketed extensively in recent years—particularly in the smaller packages—for home use. It has the advantage of being completely non-flammable, but prolonged exposure to its vapors may produce illness because it is a metabolic poison. Under ordinary conditions of use it is not dangerous.

Carbon tetrachloride, like other chlorinated solvents, has a wide range of solvent power, but this is partly cancelled by its high volatility and consequent difficulty of proper application. Garments treated with it are free from odor in a few minutes.

Benzene is infrequently used because of its high toxicity, flammability, and volatility. Toluene and xylene are more popular, although insufficiently purified grades may have unpleasant odors. Their lesser volatilities and lower toxicities under conditions of use make them preferable to benzene.

Their flammabilities can be lowered by the admixture of chlorinated solvents, as noted later. Aromatic solvents also have a wirer range of solvency than aliphatics.

Trichloroethylene and tetrachloroethylene (perchlorethylene) have been becoming increasingly popular for home use and for commercial dry cleaning. They are reported to be better solvents than carbon tetrachloride, their evaporation rates are somewhat slower—which permits easier use—though it leads to longer persistence of odor. They are believed to be the least toxic of the common chlorinated solvents.

The compounds mentioned are those most widely used, but such solvents as cyclohexanol, dichlorobenzene, turpentine, tetrahydronaphthalene, and various low molecular weight alcohols and esters have been marketed from time to time. None of these has proved capable of realizing volume sales.

In the removal of special stains, many solvents, among them acetone, chloroform, ethyl acetate, and ethylene dichloride, have been used by professional cleaners. But they are not normally sold for general use, for, in the hands of an untrained person, results can be disastrous. The

aforementioned chemicals will, for instance, dissolve holes through acetate rayon fabric. Sodium hypochlorite, too, is useful for removing some dye stains, but it will attack silk and wool and bleach out many fabric dyes. This article discusses only all-purpose cleaners which can be used by the general public.

IMPORTANT CONSIDERATIONS

If complete non-flammability is desired a straight chlorinated solvent should be used. The main objection to this is cost.

Ewing Galloway Photo

Packaged spot removers and dry cleaning fluids have largely displaced dangerous gasoline. Besides being safer, newer products also render fabrics mothproof and water-repellent.

Chlorinated solvents are much more expensive than hydrocarbon solvents, particularly when cost is figured—as it ought to be—by volume. Therefore a mixture is frequently employed, with the chlorinated solvent present in sufficient quantity to maintain the flash point at a safe figure. Incidentally, trichloroethylene is ineffective in raising the flash point of hydrocarbons. Regulations governing permissible flammability vary from locality to locality, but a minimum flash point of about 100° F. is the most common specification.

The mere fact that a mixture shows a high initial flash point is no guarantee of safety. The chlorinated solvent may evaporate out of the mixture at a different rate than the hydrocarbon, leaving a highly flammable residual fluid. This may occur if the container is left unstoppered, or in any event, every time the mixture evaporates from the fabric to which it is applied. Therefore flash points of a mixture must be known to remain at 100° F., or higher, down to about 90 per cent evaporation, if safety is to be assured. Various mixtures of specific hydrocarbons and chlorinated solvents claimed to be non-flammable throughout their evaporation range have been patented.

In this connection it may be pointed out that relative volatilities of liquids cannot be specified by vapor pressure alone. Other factors, such as heat of vaporization, viscosity, and thermal conductivity must be considered. Furthermore the relative vapor pressures of pure liquids need not determine their partial vaopr pressures when mixed since Raoult's Law may not hold. Thus the only safe method of determining the change in composition and flash point of a mixture of liquids during evaporation is by actual experiment.

Organic solvents of the types mentioned effectively remove grease and oil spots, as well as many types of paints, gums, and resins. They are of some aid in removing powdered insoluble soil, since they dissolve the grease which often attaches dirt to the fabric and simultaneously furnish a medium into which the soil can disperse. They are of almost no help in removing water-soluble stains such as syrups, or dyes such as inks, or iodine. In the case of the last-mentioned special compounds must be used, and are sold for this purpose. Sodium thiosulfate, for example, eradicates iodine spots—by conversion to sodium iodide. Other stain removers are available for the decolorization of iron-tannin inks by conversion of the colored ferric salts to colorless ferrous compounds.

To aid removal of insoluble oils the dry cleaning industry has commonly incorporated super fatted soaps in cleaning fluids. Such soaps improve cleaning efficiency by increasing the ability of the solvent to wet the fibers and by assisting in the dispersal of the soil. In order to make the solvent capable of removing water-soluble stains small percentages of water may be dispersed in dry cleaning fluids. When this is done it is usual to include an oil-soluble surface agent to keep the water finely emulsified and thereby avoiding water-spotting of the garment. Soaps are of some aid, but apparently certain synthetic agents are more effective.

Nevertheless, as yet, most home spotting fluids do not contain water or detergents. The inclusion of these in a formulation would complicate the can corrosion problem and make the fluid cloudy. But a few products on the market do contain agents of this sort, and it is probable that more will in the future.

CORROSION PROBLEMS

Metal corrosion has been a problem of considerable importance since the advent of the chlorinated solvents. Hydrolysis can cause the liberation of hydrochloric acid and consequent attack of metal containers, or metal caps if the fluid is packaged in bottles. Carbon tetrachloride is quite susceptible to hydrolitic attack of this sort, and use of a corrosion inhibitor is advisable. A large number of inhibitors, mainly amines, have been patented. Trichloroethylene is claimed to be quite stable in the dark, while tetrachloroethylene is claimed to be stable even when exposed to light. The various chlorinated solvents are obtainable in stabilized form with inhibitor already added.

The presence of emulsified water would, of course, increase the corrosion problem by favoring hydrolysis as well as direct attack on and rusting of the metal. Hydrochloric acid formed by hydrolysis is also undesirable because it may attack and weaken vegetable fabrics.

RECENT DEVELOPMENTS

All volatile organic solvents have noticeable odors. Some are highly unpleasant; others quite tolerable. Many attempts have been made to improve the odor of spotting fluids by adding small quantities of perfume oils, but casual efforts have more often than not yielded unfortunate results. Many perfumes, pleasant enough in themselves, clash outrageously with the fluids they are supposed to improve. Such perfuming of cleaning fluids is important. It must be done carefully and scientifically, for few factors can influence sales as substantially as can odor. In recent months there have been several well-perfumed fluids placed on the market, and they have met with immediate consumer acceptance. They may be but the forerunners.

Too, spotting or cleaning fluids are now available which are in effect multi-purpose specialties. Some have agents incorporated therein which will moth-proof fabrics. Others are designed to clean and render the fabric water-repellent. One new product combines these three functions.

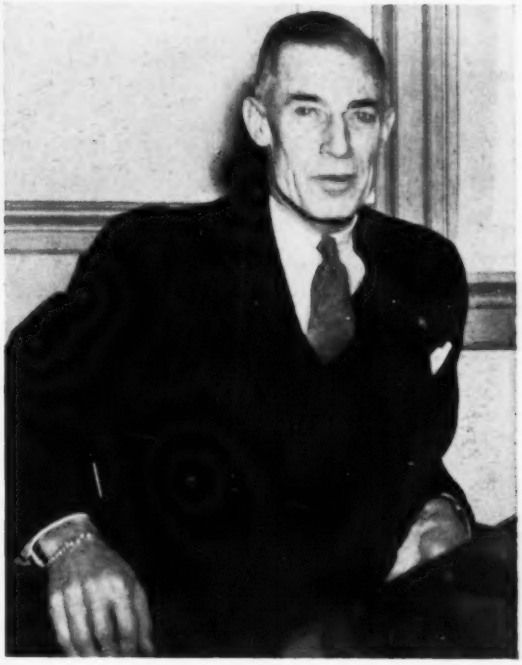
As more and more containers become available, there is every reason to believe that many new brands of spot removers will be marketed. And it is probable that many will be of the multi-purpose type. They will perform other chores besides cleaning, and thereby garner a still larger share of the household specialties dollar.

THE CHEMICAL PANORAMA

NEWS OF THE CHEMICAL PROCESS INDUSTRIES IN PICTURES

PEOPLE

Major General William N. Porter, named president of Chemical Construction Corp. He has been vice-president since resigning from the CWS.

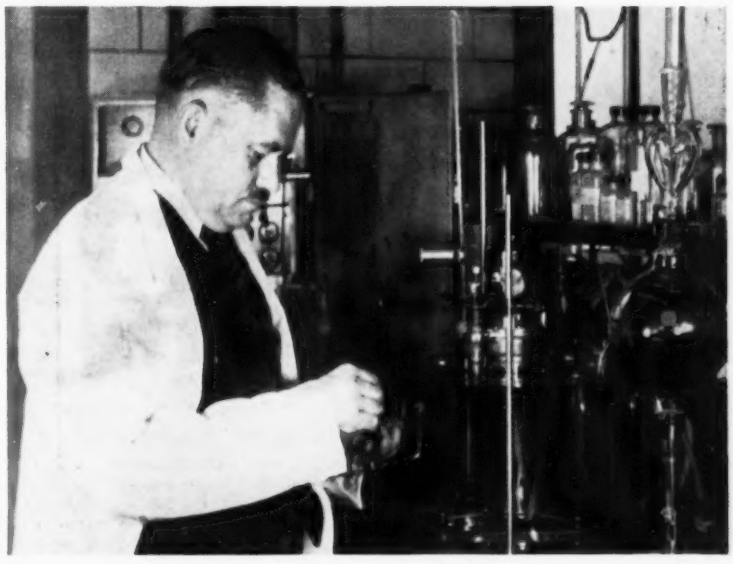


Fraser M. Moffatt Jr., named manager, Export Dept., Calco Chemical Division, American Cyanamid Co. Previously he was a vice-president of U. S. Industrial Chemicals, Inc.

W. F. Twombly, appointed technical director, Witco Chemical Co., New York. Before joining Witco he was with the WPB Chemicals Bureau.

Anderson W. Ralston, winner of the 1947 Midwest Award of the St. Louis Section of the American Chemical Society. Dr. Ralston received the medal (above) in recognition of his work at the Armour Research Laboratories, Chicago.

During the past 16 years he has been issued some 100 patents, dealing mainly with fatty acids and fatty acid derivatives. From his work have come many of these commercially-useful chemicals.



A Versatile Pilot Plant

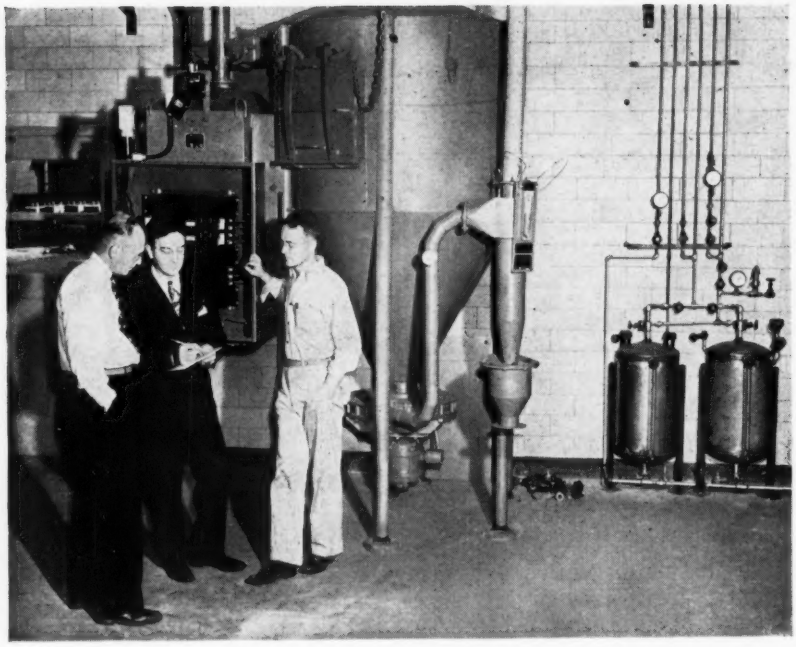
Few divisions of the chemical industry have progressed more rapidly in recent years than has the pharmaceutical industry. The production of streptomycin and penicillin are two of its major accomplishments, but there are a myriad other novel and useful compounds emerging from the research laboratories daily.

Today the manufacture of pharmaceuticals is a highly-developed business—far removed from its mortar and pestle beginnings. And the stature which research has assumed is well portrayed by the modern pilot plant of Abbott Laboratories, Chicago.

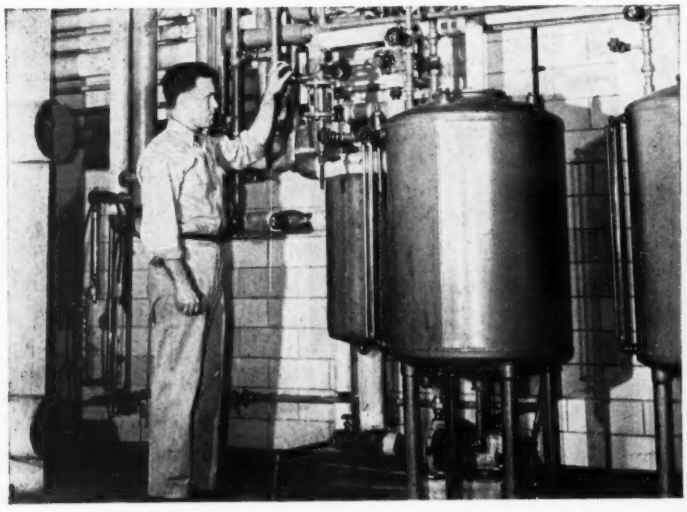
Particularly noteworthy is the versatility of the pilot unit, attested to by the fact that it has been used for the development of anti-biotics, anaesthetics, anti-spasmodics, and many other complex, chemically-unrelated compounds.

Corrosion problems have also been carefully considered. Most of the equipment is Pfaudler glass lined; some other units are fabricated from #316 stainless steel.

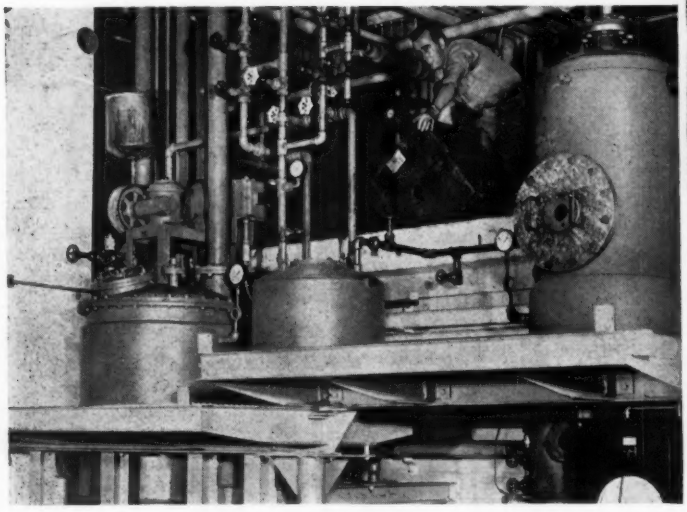
Total floor area is approximately 12,000 square feet.



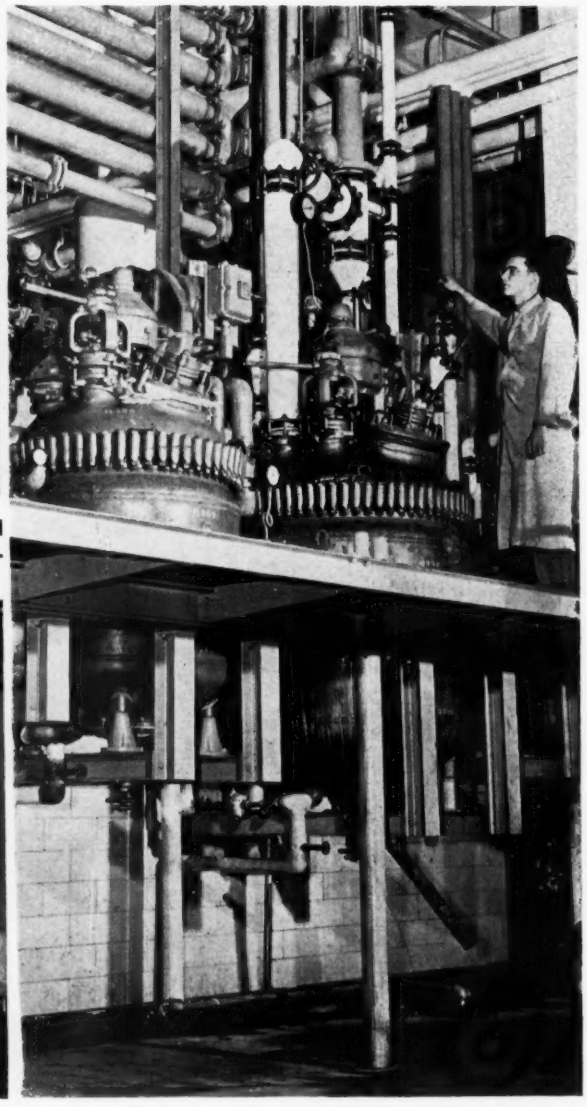
Most available types of dryers have been installed, including rotary vacuum, vacuum drum, high frequency electronic, and a spray dryer as shown above with feed tanks.



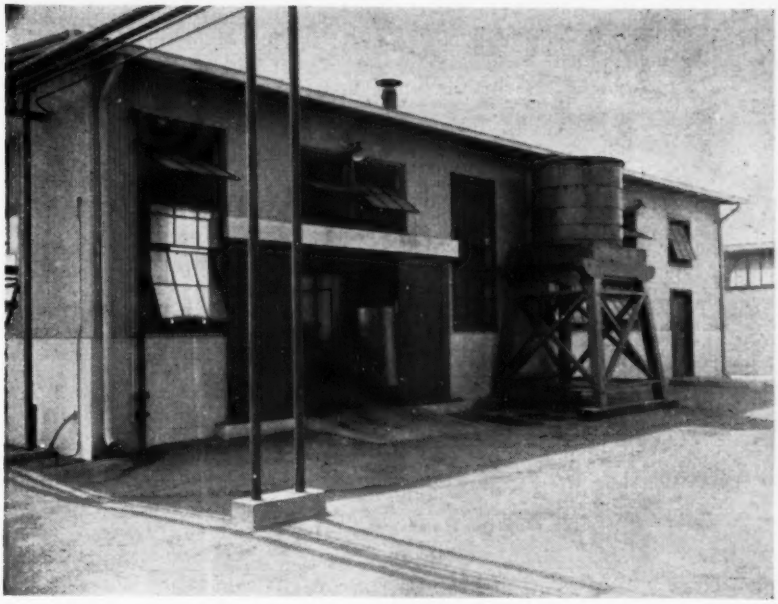
Long tube vertical evaporator is used both for process development and occasional small production problems. Operator makes flow regulations.



Stainless steel reactor, condenser, and receiver. On the right is stainless steel vacuum crystallizer. Planned installations include: 10 gallon autoclave and complete small-scale fermentation equipment.

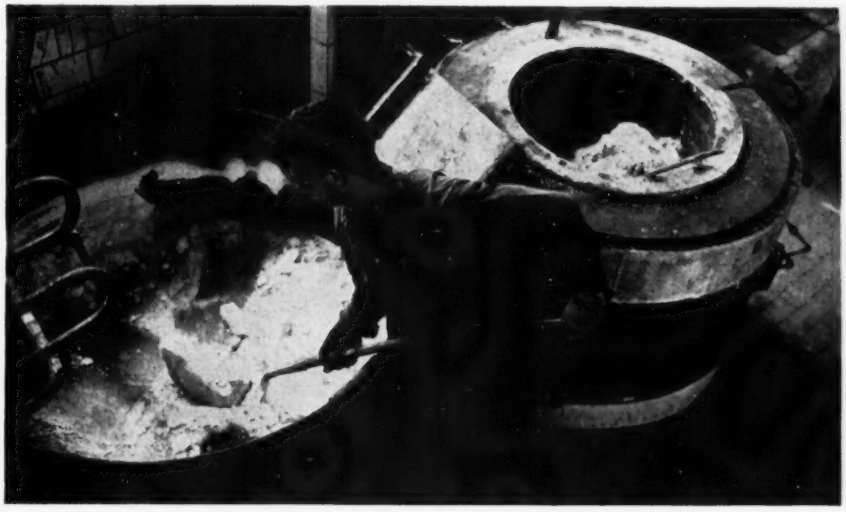


One hundred and two hundred gallon glass lined reactors. One reactor has glass lined jacketed pipe condenser; other has tantalum condenser. Flush bottom valves are glass-lined.



Located at Seal Beach, Cal. this potassium iodide plant has a total staff of two men.

Iodine crystals enter KI plant—in a real bathtub.



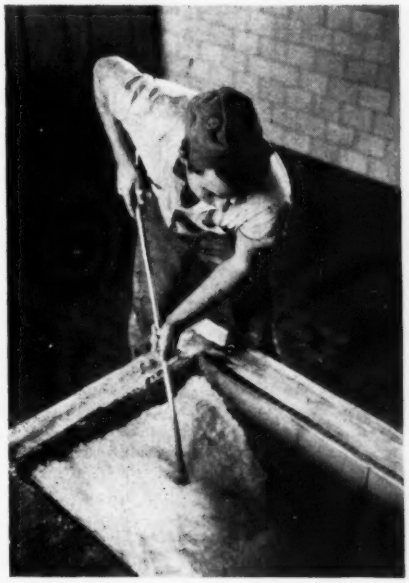
Iodine is reacted with caustic potash to form KI and potassium iodate. Iodate is reduced and organic matter removed by heating in smelter to about 600 Centigrade.

A Big Little Plant

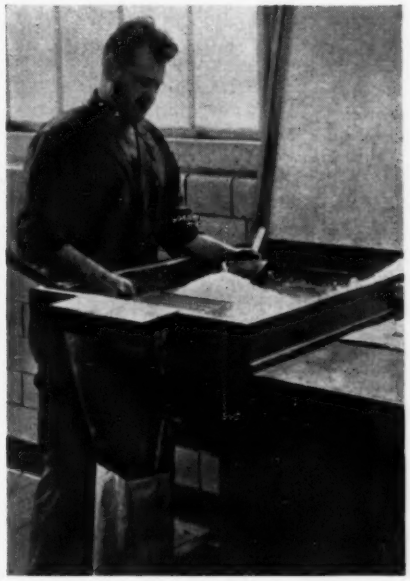
One of the smallest chemical plants in the U. S. A. is the Seal Beach potassium iodide project operated by Dow Chemical Co. as a part of its Great Western Division. The unit is an outgrowth of the old Jones Chemical Co., McDade, La.—one of the original makers of KI. When Dow acquired the Jones enterprise, operations were moved to the present site.

From 1933 to 1946 the Seal Beach plant carried a one man staff, but last year, when production was doubled, the "staff", too, had to be increased to two men.

Even though the plant itself is tiny, output, in terms of dollar volume, is sizable. And although the bulk of the iodide made is sold in the United States, fair sized shipments are regularly consigned to foreign countries.



After purification, solution is concentrated to saturation point and KI crystallizes out.



Centrifuged and oven-dried crystals are run through quarter inch screen and packaged.

Barrels are sold domestically; kegs are for export. Kegs at right are slated for Shanghai.

The first running of the A.I.Ch.E. Derby at Louisville last month attracted enthusiastic crowds to the betting windows. Above, eager winners await the pay-off while track officials calculate the final odds. Above left, the newly acquired riches are "reinvested." Circle, A. B. Newman, vice-president of the Institute, places 50 "derby dollars" on "Pot Still" (L. Bass, trainer; C. Stine, jockey) to win in the fourth race.

A.I.Ch.E. Meets At Louisville

Over 500 chemical engineers, largely from southern and southeastern areas, attended the regional meeting of the American Institute of Chemical Engineers held as Louisville, Ky., Feb. 16-19. They listened to 18 technical papers, visited a number of chemical plants in the area, including those comprising Louisville's famed "Rubbertown," one of the major wartime synthetic rubber production areas, and participated in an unusual and enjoyable entertainment program (see above). A brief resume of some of the technical papers is given on page 481 of this issue.

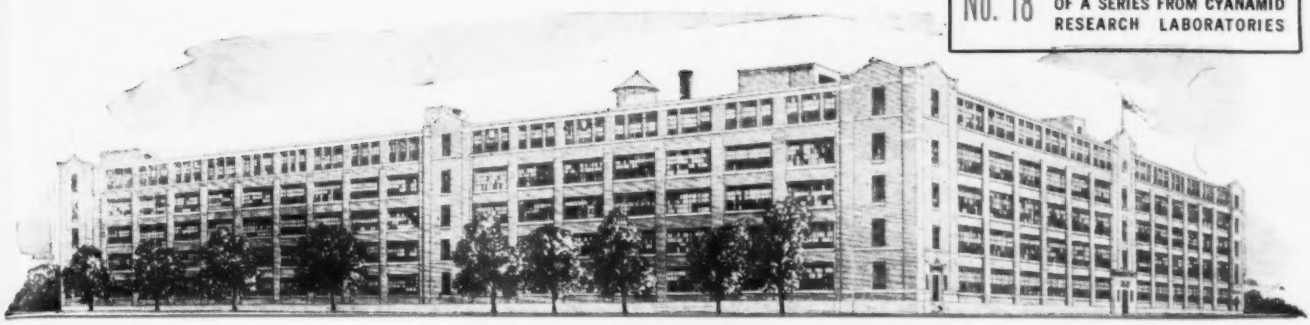
Robert C. Ernst, head of the department of chemical engineering and industrial research institute at the University of Louisville, and honorary chairman of the meeting, confers with Robert M. Reed of the Girdler Corp., general chairman.

New Western Chlorine Project

Expected to be in production by this summer, the chlorine-caustic soda unit being built at Portland, Ore. by the Pennsylvania Salt Manufacturing Co. is now about 60 per cent. completed. Two of the main buildings are shown in the photograph, with the framework for the evaporator unit and the storage tanks at extreme left.

A DDT plant is to be built in conjunction with this development, with its output to be sold mainly on the coast and to Pacific export markets.

No. 18 OF A SERIES FROM CYANAMID RESEARCH LABORATORIES



β-Chloropropionitrile

$Cl\text{-}CH_2\text{-}CH_2\text{-}CN$

...combines the reactions of both alkyl halide and alkyl nitrile

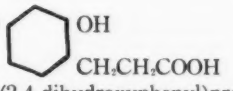
β-Chloropropionitrile* is a new chemical recently released by the Cyanamid Research Laboratories. Due to the presence of a reactive group on either end of the molecule, it offers promising application in many fields—pharmaceuticals, plasticizers, dyestuffs, surface active agents, high polymers.

A few of the interesting organic compounds which have been prepared from β-Chloropropionitrile are listed below, but many of its chemical possibilities undoubtedly await your discovery.

$ClCH_2CH_2COOH$
β-Chloropropionic acid

$ClCH_2CH_2C(=O)OC_2H_5$
β-Chloro ethyl propionate

$S(CH_2CH_2CN)_2$
Bis (β-Cyanoethyl) sulfide


β(2,4 dihydroxyphenyl)propionic acid

Other possibilities are suggested by metathetical reactions of the chloride radical to form succinonitrile, β-hydroxy nitriles, other β-halogen nitriles.

Our technical data sheet contains a literature survey, patent references, and a review of the research done in our own laboratories. A research sample is available upon request to carry on your investigation.

Our technical representatives will welcome the opportunity to cooperate with you in your work with this class of compounds.

Physical Properties

Molecular Weight	89.52
Physical Form	Colorless liquid
Boiling Point	85-86°C. at 30mm., 174–176°C. at 752 mm.
Specific Gravity	1.144 at 18.5° C.
n_D^{25}	1.3591

Solubility: Soluble in alcohol and ether.

Other Cyanamid Nitriles

Alpha-Hydroxy Nitriles
- Glycolonitrile $HOCH_2CN$
- Lactonitrile $CH_3CHOHCN$

β-Hydroxynitriles
- Ethylene Cyanohydrin $HOCH_2CH_2CN$

Unsaturated Nitriles
- Acrylonitrile $CH_2{=}CHCN$

Alkoxy Nitriles
- β-Isopropoxypropionitrile $(CH_3)_2CHOCH_2CH_2CN$

**Available in research quantities only.*

AMERICAN
Cyanamid
COMPANY
Industrial Chemicals Division

Headquarters For Nitrogen Chemicals

SAMPLES AND TECHNICAL DATA

American Cyanamid Company
Section ON, Synthetic Organic Chemicals Dept.
30 Rockefeller Plaza, New York 20, N. Y.

Gentlemen:

☐ *Send me sample of β-Chloropropionitrile* ☐ *Send technical data sheet*

*Name*_____

*Position*_____

*Company*_____

*Address*_____

LABOR RELATIONS

by *NATHAN C. ROCKWOOD*

Right of Free Speech by Employers

For many years NLRB has tended to take a narrow view of the employer's right to express his opinion on a union in which his employees might have an interest. Recently, however, the Board's decisions have been swinging back in the direction of free speech for employers as well as for unions.

IT MAY seem to employers who have read week after week, month after month, even year after year, the rulings of the National Labor Relations Board, and the decisions of the courts upholding the Board, that employers have no rights and privileges left. It is true that most of the emphasis in the spot news has been on defeats suffered by employers; nevertheless, with growing experience and some changes in personnel, the N. L. R. B. and the courts have slowly come through with reestablishment of rights the Wagner Act apparently did not wipe out.

Right of Free Speech

Since the chief purpose of the N. L. R. A. was to prevent any interference by the employer with the right of employees to bargain collectively, which naturally meant the right to form a union, the National Labor Relations Board has attempted to construe narrowly the employer's right even to express an opinion regarding a union in which some of his employees might have an interest—provided, of course, that his opinion could be interpreted as "hostile." There are numerous rulings of the Board holding that the employer had used "unfair labor practices" in expressing such an opinion prior to an election of union representatives or by expressing in acts that employees need not join a union to receive an increase in pay, or paid vacations, etc.

Notwithstanding the guarantee of free speech in the First Amendment to the Constitution of the United States, the courts have held that the National Labor Relations Board had the power to decide in specific cases whether the employer exceeded this constitutional right, or as it is now sometimes referred to—"privilege." Gradually, probably because such a right has always been considered one of the most sacred of our individual liberties, the Board eased off, and its more recent rulings have been a little more liberal. However, it ruled in the Clark Bros. Co. case No. 3-C-775, August, 1946, that the employer used coercion by merely making his employees listen to a speech, on the company's time, one hour prior to a union organization meeting.

The speech was described in the Board's ruling as anti-union, although it was not contended that it contained any threats or other attempted coercion, as such. However, the words of the Board's decision were: "The law may and does prevent such use of force (compelling employees to listen) without denying the right to speak. Similarly we must perform our function of protecting employees against that use of the employer's economic power, which is inherent in his ability to control their actions during working hours. Such use of his power is an independent circumstance, the nature and effect of which are to be independently appraised." Thus was born the theory of "free" and "captive" audiences.

Ewing Gallaway

An employer has the right to discuss unions with his employees as long as he avoids threats and coercion.

It remained for Montgomery Ward & Co. (Sewell L. Avery, also of U. S. Gypsum Co. fame) to fight a similar case through to a United States Court of Appeals (Eighth Circuit, St. Louis, Mo.). The court's decision was rendered October 23, 1946, and should clip the wings of the National Labor Relations Board to some extent, at least. The Board held that the company had violated the N. L. R. A., among other things, by a speech made by the company's manager of labor relations. The case grew out of an attempt of the C. I. O. to organize the company's Kansas City plant. Prior to the election ordered by the National Labor Relations Board, the company's manager of labor relations summoned the employees in small groups to come and listen to his speech. The election was held and the union won the retail store employees but lost the mail order unit employees.

The burden of the manager's speech was an answer to many charges published by the union, in a periodic bulletin, that the company "is unpatriotic, that it cheats the employees, maintains rotten labor conditions, engages in corrupt dealings, violates the law," etc. and etc. To stop these libelous and false accusations, the manager of labor relations told the various groups of employees, in his speeches to them, that the company had filed suit in the courts at Chicago. The court at St. Louis quoted some of the false and malicious statements made in the union bulletins, in its decision, to show that the company spokesman was merely "meeting and joining the issue before its own employees with those who were assailing it." The N.L.R.B. had paid no attention to the union's scurrilous attacks, having assumed apparently that the union was especially privileged in *its* right of freedom of speech.

Compulsory Attendance Not a Factor

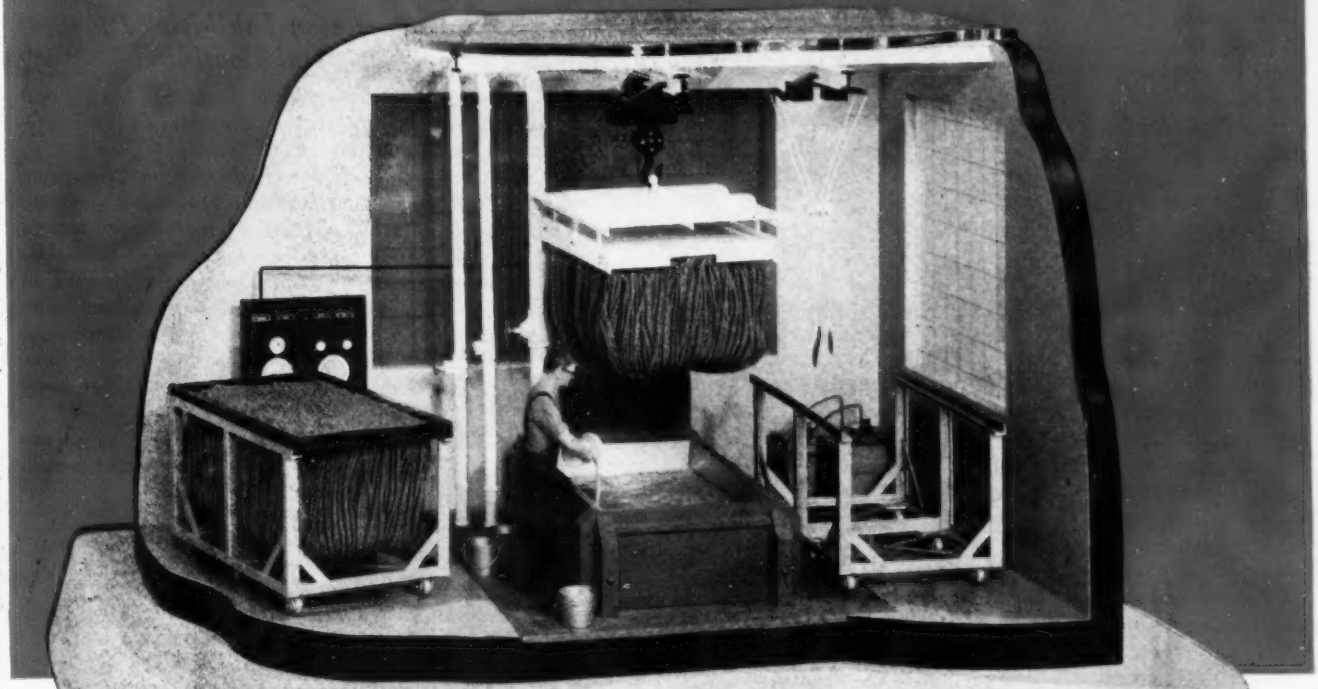
The court held that the right of free speech guaranteed by the First Amendment to the Constitution "is not limited to any class and is not denied an employer by the terms of the National Labor Relations Act. It is only the abuse of that right in attempting to coerce employees that is forbidden by the Act." It was argued by the National Labor Relations Board, according to its rulings in previous cases, that compulsory attendance of the employees at the meetings was a species of coercion.

The court ruled: "Certainly the employers have the right to meet their employees for discussion and presentation of matters of policy of mutual interest . . . In asking its employees to attend a meeting on company time, at which affairs of mutual interest to the company and to the employees were to be discussed, the company was employing a convenient means of communicating with its employees. The employees were paid for attending and were not inconvenienced in the least. If they were influenced against their will by the arguments presented, this was a legitimate consequence of free speech and presumably is one of its purposes. Free speech is not limited to ineffective speech."

The N. L. R. B. argued that the speech of the company's manager of labor relations discouraged union membership be-

(*Turn to page 527*)

VICTOR *Chemicals*



for... TEXTILES

VICTOR CHEMICAL WORKS

In dyeing textiles, Victor Formic Acid is extensively used as an acidulent in the dye bath. As a medium-strength acid, it produces colors that are both level and fast. Complete exhaustion of the dye bath assures economy, and because of the volatility of formic acid the danger of tendering the fabric is eliminated. ¶ Other Victor chemicals used in the textile industry include: **Oxalic Acid** (bleaching), **Sodium Phosphates** (buffer in dye baths, detergents, dyeing, process water treatment, water softeners), **Victawet 58 B** (dispersing agent), **Victawet 35 B, Victawet 12** (dye carriers, penetrants), **Phosphoric Acid** (dyeing), **Flexible Fyrex, Ammonium Phosphates** (flameproofing), **Victamine D** (textile softening agent), **Aluminum Formate** (waterproofing).

VICTOR CHEMICAL WORKS, 141 W. Jackson Blvd., Chicago 4, Ill.
NEW YORK · KANSAS CITY · ST. LOUIS · NASHVILLE · GREENSBORO, N. C.
Plants: NASHVILLE · MT. PLEASANT, TENN. · CHICAGO HEIGHTS, ILL. · VICTOR, FLA.

NEW PRODUCTS & PROCESSES

Phenylmagnesium Bromide NP 455

Phenylmagnesium bromide has been added by Arapahoe Chemicals, Inc., as the second of a series of Grignard reagents which it is offering to the chemical trade in research and pilot plant quantities.

The company states that phenylmagnesium bromide and methylmagnesium bromide are now available for immediate delivery in drum lot quantities at prices which make the use of these highly reactive organic intermediates attractive for the commercial users.

Varnish Resin From Petroleum NP 456

A new-type synthetic resin varnish base from petroleum is a product of Esso Laboratories.

Called A-resin, the substance was tailored to the specifications of the paint and varnish industry. At the time the work was started, three years ago, no satisfactory process had been developed to make high-quality synthetic resins from crude oil. Technicians of the paint and varnish industry cooperataed with the Esso Laboratories in the development.

An A-resin coating is said to have excellent qualities of adhesion, flexibility and wetting power which particularly fit it for use on surfaces difficult to paint with ordinary paint. As a baked priming coat it is hard, durable, light-fast and chemically resistant. A-resin pigmented films air-dry quickly, have good light stability and retain a high and lasting gloss.

The new short-oil-length resin also promises good results if used as a base for textiles, footwear and rubber adhesive. A fair-sized plant soon will be producing the new material in commercial test quantities.

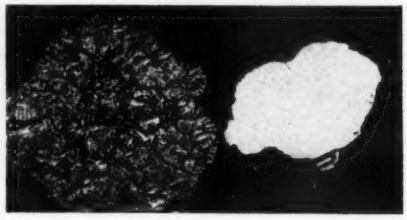
Silver Finish NP 457

The Hanson-Van Winkle-Munning Company, Matawan, New Jersey, offers a new material, said to produce a rich oxidized or "antiqued" effect on sterling and silver-plated products.

No electric current is required. The work is simply immersed in Platin-Nig solution, as it is called, prepared according to simple directions. The parts are then high-lighted for striking light-and-shadow relief.

Enamel Stripper NP 458

A new spot enamel stripper designated as Enthone Enamel Stripper S-45, for removal of synthetic enamel and other



coatings, has been developed by Enthone, Inc. This stripper is recommended for stripping of enamel on large parts that cannot be immersed in a stripping solution.

Stripper S-45 is a slightly viscous liquid that can be brushed, sprayed or applied by dipping to the work to be stripped. It contains a non-waxy evaporating retardent that keeps the stripper on the work until stripping action is completed. Stripping is accomplished by a wrinkling action so that the enamel can be brushed, wiped, or scraped off. No waxy residue is left to interfere with adhesion of subsequently applied finishes. The two stages of removal are shown in the illustration.

The stripper is stated to have very fast action on most synthetic enamels as well as certain nitrocellulose coatings. It is not satisfactory for linseed oil paints, phenol-formaldehyde enamels or vinyl type coatings. Modified urea-formaldehyde, melamine, and alkyd coatings are rapidly stripped. The stripper has no harmful action on metals, plastic, or wood.

Corrosion-Inhibitive Pigment For Metal Coatings NP 459

National Lead Company has a new pigment, called Pigment E, for metal protective paints.

The new pigment, barium potassium chromate, possesses a desirable combination of properties, most important of which is its ready release of corrosion-inhibitive $CrO_4^=$ ion in the presence of water. Paint primers formulated with this product produce coatings which have shown outstanding performance in protecting iron, steel and the light metal alloys.

The physical and chemical properties of this new product are indicated below:

Color	Pale Yellow
Specific Gravity	3.65
Bulking Value (gallons per pound)	0.0329
Weight of one solid gallon (pounds)	30.4
Oil Absorption	11.6
Combined Water	None
Total Chlorides, as Cl	0.015%
Water Soluble Chlorides, as Cl	0.004%
Water Soluble Sulphates, as SO_4	0.05%
pH (water slurry of pigment)	7.0
Organic colors and lakes	None
Refractive Index	1.9

Paints containing Pigment E may be made with vehicles containing various resins in current use. Paints made with Pigment E have excellent package stability.

Pigment E is available, for the present, in sample amounts and in quantities sufficient for small plant development purposes.

Anti-Corrosive for Ferrous Metals NP 460

An anti-corrosive process which is said to afford 20 years' protection to ferrous metals against all common corrosive forces, has been introduced by Industrial Metal Protectives Corp. of Virginia.

"Zincilate," as the process is called, has been used successfully on pipelines; on the interiors and exteriors of water and gasoline tanks and bridges; on machine parts, and on marine installations where it is not only anti-corrosive but also anti-fouling.

"Zincilate" is unaffected after 1,000

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (3-7)

Please send me more information, if available, on the following items. I understand that nothing further may be available on some of them.

NP 455	NP 458	NP 462	NP 466
NP 456	NP 459	NP 463	NP 467
NP 457	NP 460	NP 464	NP 468
	NP 461	NP 465	NP 469

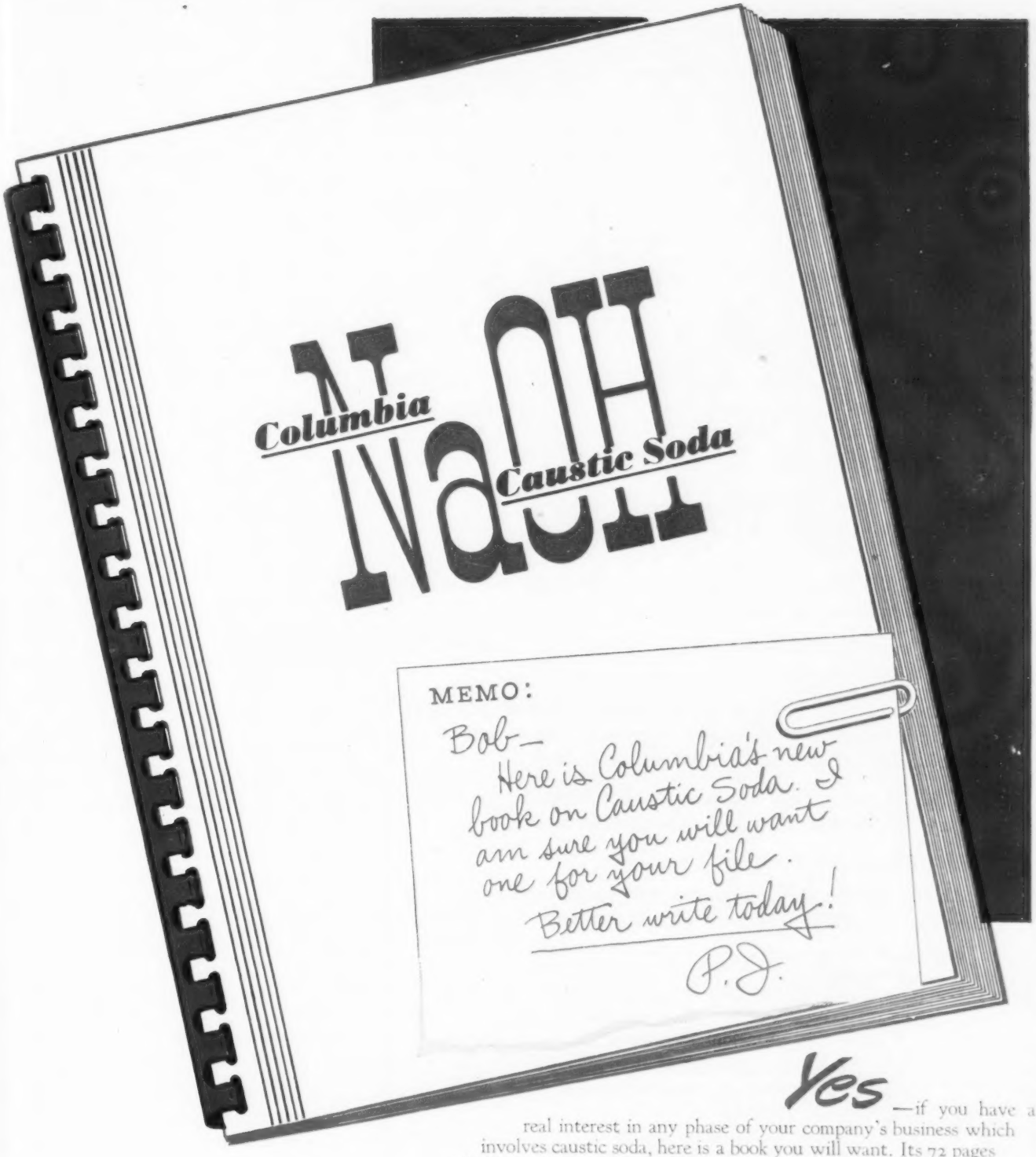
Please Print:

Name ..... (Position) .....

Company .....

Street .....

City ..... Zone .... State .....



Yes—if you have a real interest in any phase of your company's business which involves caustic soda, here is a book you will want. Its 72 pages —8½" x 11"—are full of information on the best procedures for unloading, handling and storing caustic soda. This is a comprehensive book for technical and operating men, engineers, purchasing agents and managing executives. We shall be glad to send you a copy if you will write us on your company letterhead.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY

COLUMBIA CHEMICAL DIVISION

FIFTH AVENUE at BELLEFIELD, PITTSBURGH 13, PENNSYLVANIA · Chicago · Boston · St. Louis

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COLUMBIA ESSENTIAL INDUSTRIAL CHEMICALS

Soda Ash · Caustic Soda · Liquid Chlorine · Sodium Bicarbonate · Pittchlor *(Calcium Hypochlorite)* · Silene EF *(Hydrated Calcium Silicate)* · Calcium Chloride · Soda Briquettes *(Iron Desulphurizer)* · Modified Sodas · Caustic Ash · Phosflake *(Bottle Washer)* · CalceneT *(Precipitated Calcium Carbonate)*

hours exposure in standard salt fog corrosion equipment, as approved by the American Society for Testing Materials. Maximum specifications for the Army and Navy require only 200 hours of salt spray exposure. It is a "one-coat" protective coating having high abrasion resistance. Even when sizable areas are destroyed by unusual scraping or wear, lasting protection is assured through cathodic sacrifice of the film.

Lubricant and Vinyl Stabilizer NP 461

DS 207 is the dibasic lead salt of stearic acid, a product of National Lead Co. It is a soft, pure white, unctous powder with all the apparent lubricity of normal lead stearate, insoluble in water and in most of the common organic solvents. It reacts with warm turpentine forming a waxy compound with an approximate 5% solubility therein. This compound is in turn soluble in mineral spirits which suggests its use as a protective coating for unpainted metal, the waterproofing of fabrics, etc.

DS 207 is soluble in some plasticizers. Its basic lead content, its low refractive index and its solubility in these plasticizers make it an excellent plasticizer for some types of clear vinyl plastics. It serves both as a stabilizer and lubricant.

Added to lubricating oil stocks it produces excellent leaded greases, and its uniformity of basicity and composition is an advantage. It is also of interest in cutting oils and as a paint dryer.

Properties

Composition	Dibasic Lead Stearate
Formula	$2PbO \cdot Pb(C_{17}H_{35}COO)_2$
Color	White
Molecular Weight	1220
Specific Gravity	2.02
Refractive Index	1.60
Weight per solid gallon in pounds	16.85
Lead Content (% Pb)	51
Melting Point	decomposes above 300° C without melting.
Solubility	Insoluble in water, mineral spirits and linseed oil. 5% soluble in turpentine, soluble in tricresyl-phosphate and several other plasticizers.

Aromatic Chemicals IN INDUSTRY

THE field of Aromatic Chemicals in Industry has widened considerably in recent years.

NO longer is the use of Aromatic Chemicals restricted to the Soap, Cosmetic and Perfume Manufacturer.

AS industrial deodorants, aromatic chemicals are widely used in the production of rubber, paper, textile, paints and in many household, agricultural and industrial specialties.

FURTHER research is constantly being made by us to improve and widen our lines of Aromatic Chemicals.

PERHAPS we can be of service to you.

Among our many products the following are proving useful in numerous industries:

Butyl Phenyl Acetate	**Cinnamic Alcohol**
Lignin Vanillin	**Ionone Ketone**
Veratraldehyde	**Ionone Methyl**
Cetyl Salicylate	**Acetophenone**

Linalool Extra

Phenyl Acet Aldehyde Di Methyl Acetal
Di Phenyl Acetal of Phenyl Acet Aldehyde
Hydratropic Aldehyde
Para Methyl Hydratropic Aldehyde

To deodorize Paints for Interior Finishes
DEODORANT BOUQUET 4068

Write us for Information

Aromatics Division
GENERAL DRUG COMPANY
125 BARCLAY STREET NEW YORK 7, N. Y.
9 S. Clinton Street, Chicago 6 1019 Elliott Street, W., Windsor, Ont.

Flocking Adhesive NP 462

A new synthetic rubber adhesive has been developed by United States Rubber Company for use in conjunction with textile fibers to make plush, velour, suede and velvet surfaces.

The adhesive is said to have longer life and more flexibility than base coat enamel adhesives now being used. It can be dyed any color to match the textile fibers.

The product is called flocking adhesive M-6177. It may be sprayed or brushed on wood, metal, glass and other surfaces. It is intended for use with rayon, cotton, or wool flock.

The flocking process is widely used on poker tables, phonograph turntables, showcases, toys, shoes, jewel boxes, automobile trunks, glove compartments, bottoms of ash trays, lamps, telephones and other articles, airplane interiors, instrument panels, and sound chambers of radios and phonographs. It may be used to make thick pile fabrics.

Synthetic Detergent NP 463

"Strodex D," a synthetic detergent for use on delicate shades, has been developed by the Textile Chemical Division of Dexter Chemical Corporation. This is a smooth, cream-colored paste, readily soluble in water at 120 to 125° F.

For scouring, its range is termed wider than that of soap, which in some cases it can replace. Its resistance to hard water, acids, alkalies and salts is said to be high and it is easily rinsible. The concentrations of acids or alkalies normally used in textile processing do not affect the action of "Strodex D." It is stable enough to be used in solutions of oxidizing agents, according to the company.

Plastic Sheet NP 464

A new product, Miramesh, developed by National Research Corporation, is a metal-coated, plastic sheet with a mirror-like finish in either gold or silver color and should find acceptance for a great many decorative purposes.

The base material for Miramesh is Vimlite, produced by the Celanese Plastics Corporation. This material is a

CUT HEAT EXCHANGER REPLACEMENT COSTS WITH

"KARBATE"

BRAND

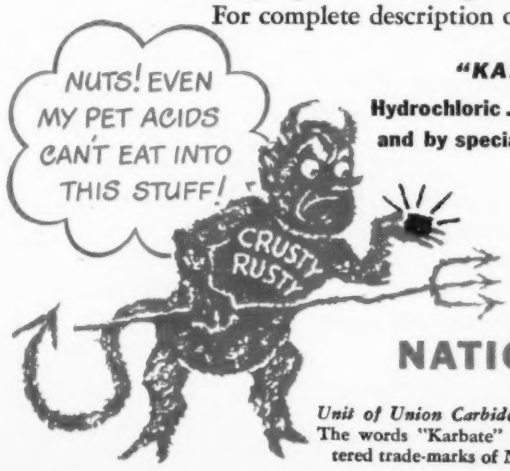
HEAT EXCHANGERS — THEY LAST *Indefinitely*

● "Karbate" Heat Exchangers will help you end the expense and delay of constantly replacing corroded heat exchangers!

"Karbate" Heat Exchangers are chemically inert. They are free from corrosion scale formation. Thus, they will stay on the job indefinitely—saving substantial replacement costs over the years.

"Karbate" Heat Exchangers have other stand-out features: A remarkably high rate of heat transfer • Extreme heat shock resistance • Light weight • Strong, sturdy — able to take rough treatment • Can be made in a variety of sizes and types from the simple plate to the large tube-bundle types.

For complete description of "Karbate" Heat Exchangers, write Dept. CI.



"KARBATE" MATERIAL UNAFFECTED BY

Hydrochloric . . . sulphuric . . . lactic . . . acetic . . . hydrofluoric acids . . . and by special caustic vapors . . . and other corrosive liquids and gases.

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation
The words "Karbate" and "National" are registered trade-marks of National Carbon Co., Inc.

UCC

30 East 42nd Street, New York 17, N. Y.
Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

Saran screen which is filled by a cellulose acetate film. In general, Miramesh can be handled by the same processes and used for the same applications as Vimlite.

On one side of the base material a thin film of aluminum is applied by a high-vacuum evaporation process. Aluminum is used because of its extreme stability and resistance to tarnishing and also because of its high reflectivity and brilliance. A protective lacquer is applied over the metal film. Other metallic colors can be obtained on special order.

Miramesh should be applied where use can be made of its basic properties: high reflectivity and brilliance, great strength in the Saran screen, opacity, and semi-rigidness.

Hydrolyzing Ethyl Silicate NP 465

A new method of hydrolyzing ethyl silicate makes the use of this silica-depositing medium considerably more economical, according to Carbide and Carbon Chemicals Corporation. The new method is an aqueous process that eliminates the use of alcohol, a major part of raw material cost in the past, and thus affords a 45 per cent saving in cost. At the same time, it markedly reduces the fire hazards involved in the use of a volatile solvent.

By this method, ethyl silicate is hydrolyzed in water with vigorous agitation or an emulsifying agent and large amounts of a catalyst. For example, if 20 volumes of ethyl silicate 40 are mixed vigorously with 4 volumes of 5 per cent hydrochloric acid, the mixture which is at first non-homogeneous becomes clear in 5 to 10 minutes. After standing about an hour, this silicate solution can be diluted with 76 volumes of water to yield an opalescent solution containing about 8 per cent silica. Such aqueous solutions remain fluid for several days and deposit adhesive silica in the same manner as do the usual alcohol solutions. By making a slight adjustment of catalyst, any desired setting time is easily obtained.

Tool for Sterilization of Raw Food NP 466

The Capacitron, built by the Electronized Chemicals Corp., is being used for experimental work in the sterilization and preservation of raw foods, drugs, and chemical compounds. It produces ultra-short electrical impulses of very high voltages and amperages which, in a specially designed discharge tube, are converted into correspondingly short bursts of electrons. Such bursts make it possible to bring out the true effects of radiation by suppressing certain side reactions. Therefore the Capacitron may be used in the preparation of new therapeuticals and in radiation therapy.

Good results have been obtained using this method on animal food products such as lean beef, lobster, fluid milk; on plant food products like peas and strawberries, and on substances as varied as novocaine solution, penicillin powder, brewer's yeast, distilled water and human plasma.

New Vinylite Coating Series NP 467

A versatile series of coatings, the vinylite organosols, qualify as highly resistant to water, grease, oil, chemicals, and heat, and are adaptable to any baking cycle. They are chemically inert, non-toxic, tasteless and may be heat sealed. Utilizing inexpensive solvents solids of 60 per cent and higher may be produced in colors or water clear. Typical applications include the paper, foil, textile, food packaging, and container industries. The coatings, which impart a smooth high gloss surface are manufactured by the Watson-Standard Co.

Cellulose Derivative NP 468

Ethulose is a water-soluble derivative obtained by etherifying wood pulp with a mixture of different etherifying agents. Depending on the desired properties of the products, the wood pulp can be pretreated in order to increase the reactivity or to modify its properties. It is supplied as white or slightly yellow flakes,

Petroleum Chemistry Now Brings You

AROMATIC DISTILLATES

These are high-boiling aromatic hydrocarbons consisting largely of unsaturated polymers recovered in the distillation of petroleum, that offer economy especially where color is not important. At present, these solvents are available in three grades . . . Aromatic HB, Aromatic H and Aromatic L.

APPLICATIONS

All three of these aromatic distillates apparently oxidize and polymerize to form films that are insoluble in hydrocarbon solvents. In film-forming properties they behave more like resins than drying oils in that they dry to hard films. Therefore, they have possibilities in printing inks, core oils, and low-cost paints and varnishes.

Soil sterilization offers a large field of use for Aromatic HB, in particular, since tests indicate that it will kill any and all vegetation. An important feature of this material is that it is not water soluble.

Other fields of indicated use for aromatic distillates include bituminous paints, saturating asphalts and flotation oils.

For samples, further information and help in applying these products to your problems, write to

ENJAY COMPANY, INC. (Formerly Standard Alcohol Company)

"The Original Synthetic Solvent Manufacturers"

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To Manufacturers of

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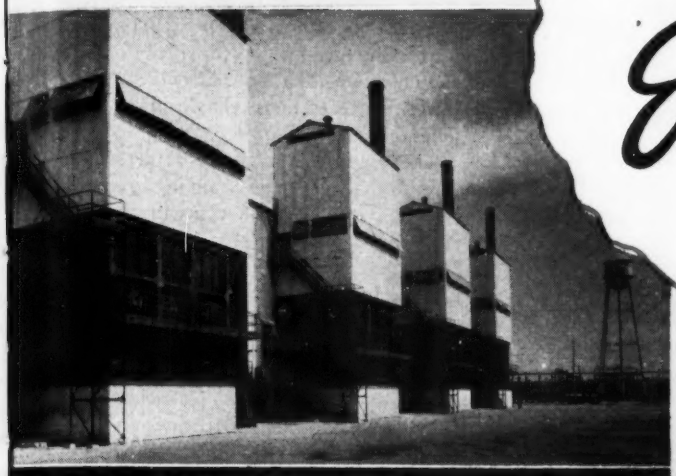
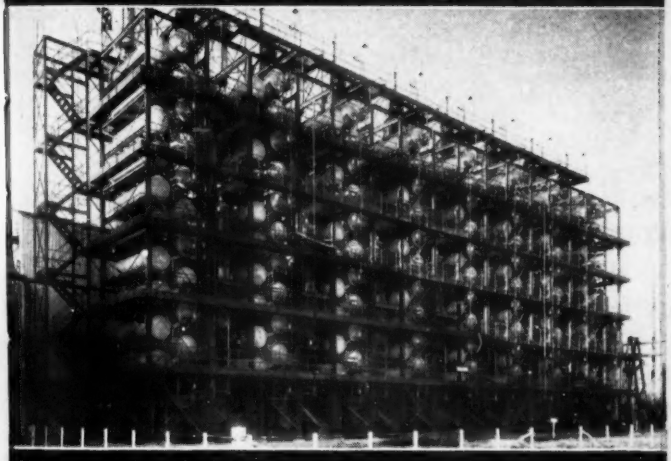
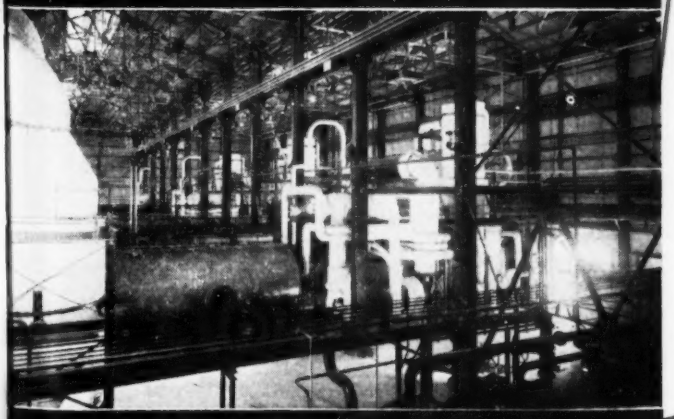


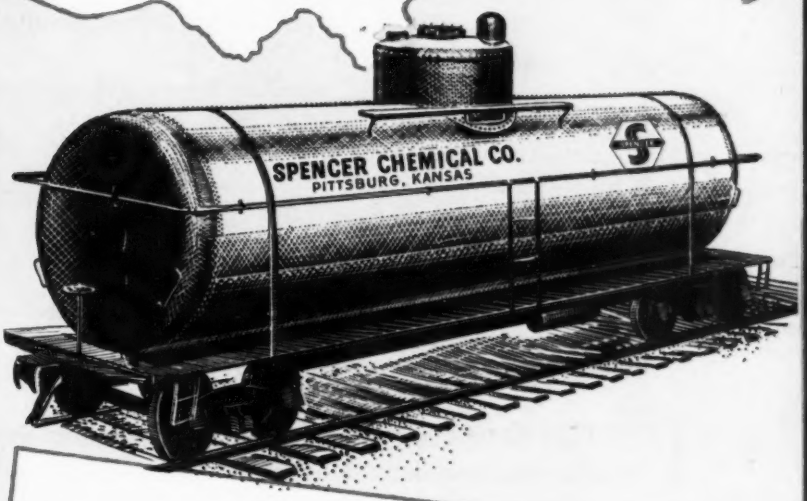
• Battery of Gas Reforming Furnaces at Spencer's New, Centrally Located Pittsburg, Kansas Works



• Section of the Nitric Acid Absorbers



• Interior of Gas Reform Building



This Great New, Central Source of NH_3 and Aqua Ammonia Is Days and Hundreds of Miles Closer

Maintaining an orderly, even rate of production and scheduled delivery of basic materials . . . is vital to assure continuing 1947 profits against higher wages and costs!

The vast new, war-proven Spencer Works is prepared to make direct tank-car shipments, asscheduled. Spencer's central location expedites delivery . . . assures an even, economical rate of production. It is practical to schedule orders well ahead. Write, wire or phone today.

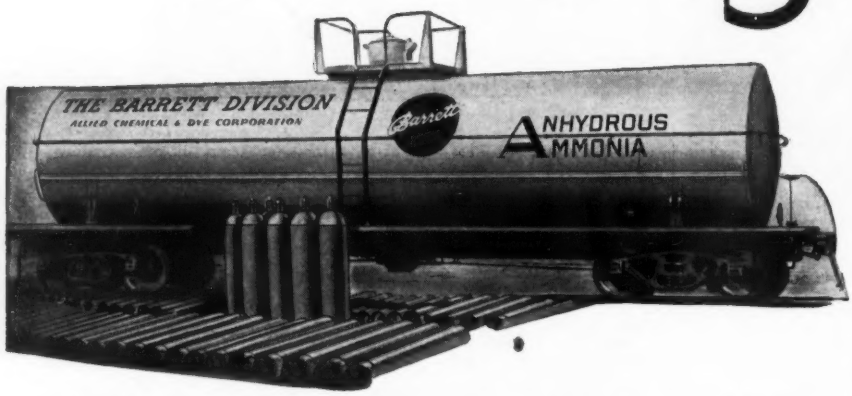
Spencer CHEMICAL COMPANY

SPENCER

General and Sales Offices: Dwight Building, Kansas City 6, Missouri

Works: Pittsburg, Kansas

Your best source of NH_3



Barrett standards of consistent purity, uniform dryness, speedy deliveries and dependable service make Barrett Anhydrous Ammonia your best source of NH_3.

Barrett Anhydrous Ammonia is available in two grades: REFRIGERATION GRADE, guaranteed minimum 99.95% NH_3; and COMMERCIAL GRADE, guaranteed minimum 99.5% NH_3. Both grades are shipped in tank cars with a capacity of approximately 26 tons of NH_3. REFRIGERATION GRADE only is also packaged in 25, 50, 100 and 150-pound standard-type cylinders and in 100 and 150-pound bottle-type cylinders.

Barrett Anhydrous Ammonia must pass rigid tests for moisture, non-condensable gases and other impurities, before release for shipment. Cylinders and tank cars are thoroughly cleaned and inspected, upon return to the plant, before reloading.

Barrett Anhydrous Ammonia is stocked in cylinders at points conveniently located from coast to coast. The advice and help of Barrett technical service men are available to you for the asking.

This interesting and helpful booklet is packed with useful information on Anhydrous Ammonia. You can obtain a copy without charge or obligation, by requesting it from the address below.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Barrett

which are odorless, tasteless, and non-toxic. Resistance against fats, oils, and alkalis is excellent.

Preparation of aqueous solutions can be accomplished by stirring the flakes in cold water (below 20° C. for best results). Clear solutions are normally obtained within one hour. The clarity of the solution is increased by lowering the temperature. When a solution of Ethulose is heated to 50-60° C. it is converted into a thixotropic gel, provided that the concentration is 3 per cent or higher. At lower concentrations simple flocculation takes place.

The product is available at present in three viscosity ranges, ranging from 25-1000 cps. at 2 per cent concentration and 20° C.

Ethulose may be used as a film forming material, sizing agent, binder, thickening agent, preservative colloid in aqueous solutions, and as an adhesive for paper and textiles. Most non-volatile alcohols may be used as plasticizers for Ethulose, e.g. glycol, glycerine, and sorbitol. Ethulose is compatible with a great many thickening agents such as gelatin, pectin, methyl cellulose, hydroxyethyl cellulose, polyvinyl alcohol, animal glue, sodium alginate, and Irish moss. Ethulose films are very flexible in unplasticized state even when fillers are present. Such films are insensitive to most of the common solvents and oils.

Synthetic Lubricant NP 469

A new lubricant, to be marketed under the brand name, Zupan "Hi-Lo" temperature grease, is a synthetic oil constituent which is said never to harden, gum nor oxidize, and is non-corrosive. It has a tough, adhesive body and is made so that it can be applied directly through high-pressure guns or compression cups. Light tan in color, it has a texture resembling that of butter.

This new, synthetic grease will not separate in use—even at temperatures in excess of the given melting point. Zupan "Hi-Lo" is therefore particularly applicable to lubrication of various types of sealed bearings, twister rings, universal joints, gears and etc., because the film remains intact.

Its resistance to both extreme high and extreme low temperatures greatly extends its range of application. From —40° to +600° F., it does not lose its fundamental lubricating characteristics.

Tannin From Desert Plant

A new process for the extraction of tannin utilizes the root of the canaigre plant, a member of the dock family. Researchers from the Department of Agriculture have found a way to process the plant at the point of harvest and are supervising experimental acreage in

Aluminum Chloride—As You Like It

Consistently uniform high purity is one reason why processors like to use Hooker Aluminum Chloride, Anhydrous. They know that here is one catalyst that will not "gum up" the works because of unknown impurities or changes in analysis from one shipment to another. Where smooth operations depend upon uniform purity of the Aluminum Chloride, you can depend on Hooker.

In Hooker Aluminum Chloride, too, you have a choice of three sizes from which you can select the one which will give you the best results.

Fine Grind .....an unscreened material practically all passing 20 mesh.

Coarse Grind ....unscreened, 1 mesh and finer containing 25 to 35% finer than 20 mesh.

Coarse Screened . .same as above screened to remove 20 mesh and finer.

Hooker Aluminum Chloride is being used as a catalyst in many Friedel-Crafts syntheses, polymerization, isomerization and halogenation. Practically free from iron (0.05% max.) it is especially desirable in the preparation of derivatives for use in the manufacture of high octane gasoline, lubricants, synthetic rubber, dyes, varnishes and pharmaceuticals.

Additional physical and chemical data on this important chemical are contained in Technical Data Sheet 714, sent when requested on your letterhead. Hooker's Technical Staff is also available for consultation and help on the application of Aluminum Chloride and the other Hooker chemicals to your purposes.

SPECIFICATIONS

Hooker Aluminum Chloride, Anhydrous $AlCl_3$

Gray, crystalline solid in three sizes.

Molecular Weight 133.3

ANALYSIS

Aluminum Chloride	98.5 % min.
Iron	0.05% max.
Non-sublimables in air at 950° C.	1.5 % max.

From the salt of the earth

HOOKER CHEMICALS

HOOKER ELECTROCHEMICAL COMPANY

3 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.
New York, N.Y. Wilmington, Calif. Tacoma, Wash.

Caustic Soda **Paradichlorbenzene** **Muriatic Acid** **Chlorine** **Sodium Sulfide** **Sodium Sulfhydrate**

WE'VE DONE IT FOR ADHESIVE MANUFACTURERS

THERE was a time when adhesives, such as mucilage, paste and glue, had anything to recommend them but a pleasant odor. But not today. Refinement of raw materials, improved processing *and* the ingenuity of technical perfumers have wrought a change. Now these adhesives —or most of them—have either no odor, or if any, it is one agreeable to the human nose. By extension of this odor-masking principle, improvement in gummed tapes, laminated and other glue-impregnated products has also been achieved. . . . Now, the question is: Have *you* such a problem to solve?

PERHAPS WE CAN DO IT FOR YOU!

In the course of your manufacturing or processing operations there may arise certain odor conditions detrimental to the efficiency or comfort of your employees . . . or your finished product may retain some residual odor that acts as a deterrent to sales. In either case we may be able to help you remove or lessen the cause. We'll try if you will write us fully . . . in confidence, of course . . . and with no obligation on your part.

FRITZSCHE *Established* 1871 *Brothers, Inc.*

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* STOCKS: *Boston, Mass., Chicago, Ill. Los Angeles, Calif., St. Louis, Mo., Toronto, Canada and Mexico, D. F.* FACTORIES: *Clifton, N. J. and Seillans (Var), France.*

southwestern New Mexico to develop cultivation methods.

Formerly, the presence of starches and sugar in the root caused fermentation and made processing impracticable. The new method separates the starches and sugar from the tannin and transforms them into a glucose that may also be used in the leather industry. The roots have a tannin content of about 25 per cent.

Lactic Acid From Sulphite Waste

Laboratory experiments at the University of Wisconsin have shown that lactic acid can be obtained by a new process of fermentation of sulphite waste liquor. Research directed toward turning this waste liquor which now presents a serious pollution problem to paper manufacturers into useful chemicals is being carried on under an industrial fellowship established by the Rhinelander Paper Co.

In this process the acid liquor from the blow-pits is prepared for fermentation by steam stripping to remove sulphur dioxide and subsequent neutralization to a slightly alkaline condition with slaked lime. After filtration to remove the sulphite precipitate and adjustment to the desired acidity by the addition of carbon dioxide the liquor is ready for fermentation with an inoculum prepared from a lactic acid-producing organism. Forty to 48 hours at 30° C. are required for fermentation. During this period the lactic acid formed (usually 1.8%) is neutralized by addition of calcium carbonate or slaked lime.

Recovery of lactic acid is accomplished by first concentrating the fermented liquor to about 40% solids and 60% lactic acid. Solvents such as amyl alcohol are used to extract the acids from the waste liquor (at 90° C.). The acids are then washed out of the solvent with water and this final aqueous solution is concentrated. The acetic acid naturally present in the liquor is removed by distillation.

New Processes for Man-Made Snow

Silver iodide and approximately a dozen other foreign materials have been found capable of nucleating cold-chamber snow storms in the laboratory.

The fact that a temperature of —31° F. is required for natural ice nuclei to form spontaneously, although natural snowstorms often occur at temperatures higher than this, leads scientists of the General Electric Research Laboratory to believe that nature often starts snowstorms with artificial nuclei. Among other foreign materials capable of acting as artificial nuclei for producing snow are lead iodide, iodoform, iodine crystals, apatite,

For Your Fine Chemical Needs

Rely on General Chemical's

Baker & Adamson Division

B&A PERCHLORIC ACID *Reagent, A.C.S.*

This B&A Fine Chemical is notable for its uniform quality—lot after lot, year after year. Three strengths—all Reagent, A.C.S. grade—are available. They assay 70-72%, 60% and 20% min. $HClO_4$ thus providing a product suitable for any of the acid's uses which include: manufacture of explosives and matches; electropolishing of steel, stainless steel, brass, nickel, copper and certain other metals; bright dipping of cadmium and zinc plates; and, as a cathode treating agent in electrodeposition of copper powder.

B&A FERROUS AMMONIUM SULFATE *Technical and Crystal, Reagent, A.C.S.*

Two Reagent grades are offered, both assaying 99.5% min. $FeSO_4(NH_4)_2SO_4 \cdot 6H_2O$. Their purity is superior to that required by A.C.S. specifications, the Reagent Special grade being particularly low in manganese. Many industrial users will find the Technical grade suitable for their needs since the fine uniform crystal available is low in insolubles and assays 98% min. Some of the applications for Ferrous Ammonium Sulfate are in the manufacture of iron blue; in the metal industry as an ingredient of brass coloring baths and iron plating solutions; and as a substitute for ferrous sulfate in a number of fields.

B&A CUPRIC NITRATE *Purified and Crystal, Reagent, A.C.S.*

Both grades of this B&A Quality chemical assay 99.5% min. $Cu(NO_3)_2 \cdot 3H_2O$. The Reagent reaches a purity even higher than that of A.C.S. requirements and is particularly low in metallic impurities, especially iron and nickel. Industry will find the Purified material suitable for most uses since this product is not only low in insolubles but also is controlled within close limits on neutrality. The range of uses for Cupric Nitrate is wide, covering such applications as manufacture of pure cupric oxide used as a petroleum catalyst; manufacture of fire-place salts and pyrotechnics; ingredient in baths and solutions for blackening copper and copper alloys, iron and zinc; sensitizer in photographic emulsions; and as a mordant in textile dyeing.

This is the third in a series of advertisements reviewing the B&A Fine Chemicals commercially available to American Industry today from the Baker & Adamson Division of General Chemical Company.

A wide range of such purity products awaits your investigation for a host of applications. To learn more about these or other B&A Fine Chemicals that meet your requirements, write or phone the nearest B&A Sales and Technical Service Office at right.

GENERAL CHEMICAL COMPANY

BAKER & ADAMSON DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

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SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

*Complete stocks carried here.

for
TESTING
SIEVES
of
ACCURACY
Newark
In testing sieves accuracy is of first importance. NEWARK TESTING SIEVES conform to A.S.T.M., N.B.S., and A.S.A. specifications. Available in a complete range of sizes and with sieve openings from 0.0015 inches to 4.00 inches. High quality precision manufacture by NEWARK gives you mesh accuracy PLUS.
For increased testing accuracy and efficiency use our "END-SHAK" Testing Sieve Shaker—a mechanical laboratory sieve shaker with better than the human touch.
Consult NEWARK when Standard Testing Sieves enter your production-control picture.
Note: We have a service now for recovering Testing Sieve Frames at nominal cost. Don't throw away frames with worn cloth. Write us.
NEWARK for ACCURACY
Newark Wire Cloth COMPANY
345 VERONA AVENUE • NEWARK 4, NEW JERSEY

nephelite, wurtzite, zincite, and cerium oxide.

In experiments with silver iodide, a silver iodide-coated string was fed into a high-temperature flame, changing the silver iodide to a gas. Simultaneously a jet of air, blown over the flame, cooled and diluted the gas, causing formation of an invisible "smoke" of extremely-small silver iodide particles in crystalline form. This "smoke" was then collected in a rubber bulb and kept there until ready for use.

When the silver iodide, in this form, was dispensed into a supercooled cloud in a cold chamber, water droplets comprising the cloud crystallized on the silver iodide nuclei, and snow resulted. The transformation from water to snow took place at a temperature of 15° F.

An indication of how small an amount of silver or other critical material is necessary for artificial seeding is seen in the estimate that the size of the nuclei is about 100 Angstroms, or about one-millionth of an inch in diameter. Unlike ice nuclei, which melt or evaporate, artificial nuclei might be introduced by generators on the ground into the atmosphere and remain there until they produce snow.

In the future this new process might be used to eliminate severe airplane icing conditions over large areas and might curtail to great extent hail storm activity prevalent in parts of the midwest. Outdoor experiments in natural conditions will be undertaken in conjunction with the U. S. Army Signal Corps Engineering Laboratories, Bradley Beach, N. J., and the U. S. Army and Navy Air Forces.

Ductile Titanium

The development of a process by the Bureau of Mines designed to increase the production of ductile titanium offers industry a new potential material in the light-metal construction field and for other possible engineering uses.

Still considered expensive to produce even under the improved method, pure titanium is a light, corrosion-resistant metal that combines the properties of stainless steel with those of the strong aluminum alloys. In the modified process, titanium is obtained by reducing titanium tetrachloride with pure molten magnesium in the presence of helium under slight pressure. Production is now 100 pounds of metal a week at the Bureau's Boulder City, Nev., pilot plant.

The fact that titanium can be surface hardened is important in the construction of parts subject to frictional wear.

A free copy of the publication, Information Circular 7381, "Metallic Titanium and Its Alloys," by R. S. Dean and B. Silkes, may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Make "Standard" BICHROMATES your standard

BICHROMATE OF SODA

BICHROMATE OF POTASH

CHROMATE OF SODA

PRIOR CHEMICAL CORPORATION - NEW YORK

420 LEXINGTON AVENUE

Chicago Office: 230 N. Michigan Ave.

Selling Agents for

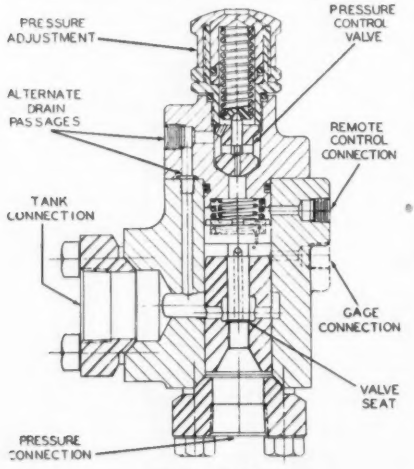
STANDARD CHROMATE DIVISION

Diamond Alkali Company, Painesville, Ohio

NEW EQUIPMENT

Extreme Pressure Relief Valve QB 171

The Superdraulic Corp. has announced a new 5,000 psi relief valve which is said to eliminate disadvantages of previous designs and incorporate numerous new



RELIEF VALVE

features. The squealing and chatter characteristic of this type of equipment is said to be completely eliminated. Instantaneous action prevents objectionable pressure peaks. Accurate maintenance of pressure setting is said to be an important feature. Provision is made for remote control.

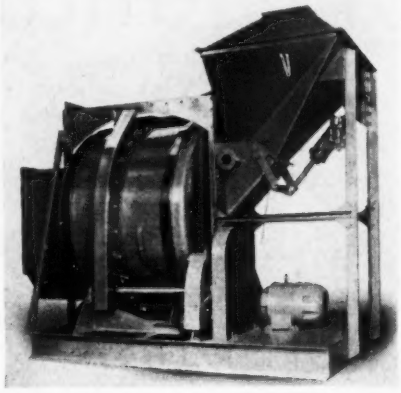
Constant Speed DC Motor QB 172

The new model of the constant speed D.C. motor of the Amglo Corp. is approved by the Bureau of Standards, the FCC, and CAA and utilizes the principle of polarized magnetic drive of a vibrating reed, the nucleus of speed control under D.C. power. This results in a powerful attraction and repulsion force which assures immediate self-starting at all times, as well as much longer periods of operation without maintenance.

When tested under actual working conditions, the new model maintained constant speeds regardless of wide variations in voltage. It was completely self-starting, attaining full speed almost instantly, and exhibited marked. increases in operating efficiency. The motor's current consumption varied from .06 to 1 watt, either from battery or direct current line sources. Shaft speeds were geared from one revolution each 24 hours to 100 r.p.m., providing clock-like accuracy previously possible only with A.C. units. It is available for use at 3, 6, 12, 24, 32, or 110 volts.

Batch Mixer QB 173

The improved batch mixer of the Ransome Machinery Co. is used for mixing



glass batches, enamel fruit, refractory cements, dry dusty materials in chemical plants, all kinds of furnace charges, and the like. It features enclosed drive reduction gear with V-belt drive from gear box to motor . . . cut teeth on large drum gear ring and pinion for smooth and quiet operation . . . air operated cylinders for discharge chute and batch hopper gate control. These cylinders can be operated with solenoid air valves so that push button control as well as electrical timing and interlocking devices can be used.

Other features include improved mixing blade arrangement for more thorough uniform and faster mix; renewable liner plates used throughout for longer life with minimum maintenance expense; and improved dust seals around drum openings, including dustproof housing over discharge chute.

The mixer shown is the standard 50 cu. ft. batch capacity unit. Other standard sizes are available from 13 cu. ft. to 120 cu. ft. capacity.

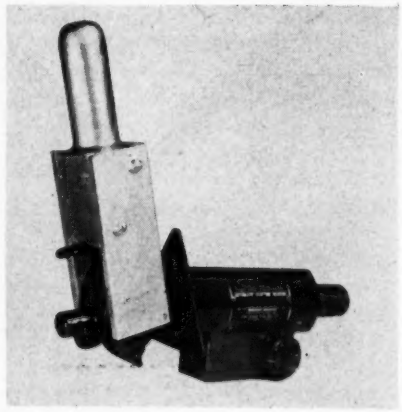
Welding Goggles QB 174

The new Speedframe goggles of Mine Safety Appliances Co. allow uninterrupted

use of both hands of the wearer. A simple nod of the head positions the goggles if the eyes are in danger . . . a nod throws them up and out of the way.

Electrically-Heated Valves QB 175

The electrically-heated valves of the Sta-Warm Electric Co. include wheel-type gate valves, molasses gate valves, and bibb-faucets. Also the heating in-



stallation can be applied on valves furnished by the customer.

In all cases the heating element is cemented directly onto the valve. This is then enclosed in heat insulation and a sheet metal housing. Accurate control of valve temperature is provided through an automatic adjustable thermostat or by means of a rheostat control. The valves can be furnished for operation on either 110 or 220 v.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (3-7)
Please send me more detailed information on the following new equipment:

QB 171	QB 175	QB 180	QB 185	QB 190
QB 172	QB 176	QB 181	QB 186	QB 191
QB 173	QB 177	QB 182	QB 187	QB 192
QB 174	QB 178	QB 183	QB 188	QB 193
	QB 179	QB 184	QB 189	QB 194

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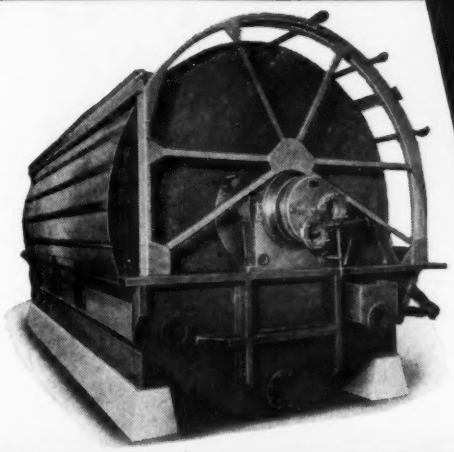
Street .....

City & State .....

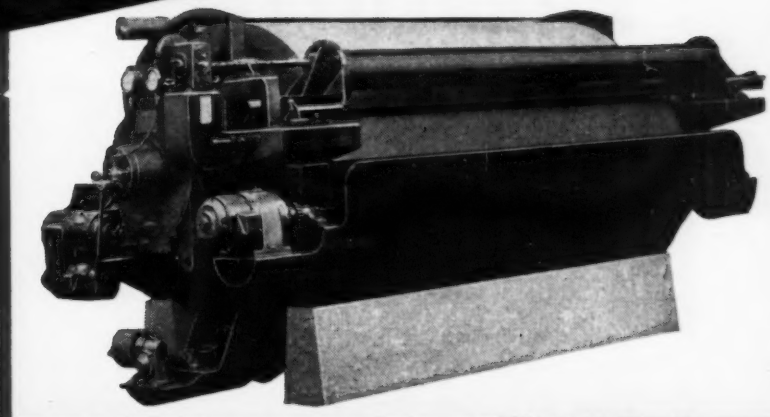
CONTINUOUS VACUUM FILTRATION

For the Slimy, Sticky "Hard to Discharge" Filter Cakes



OLIVER PANEL FILTER

With the Panel Filter, no "precoat" is used, the solids in the pulp forming the cake. The cake forms on the sectionalized filter cloth and is removed by an ingenious floating wire discharger. No wire winding is used on the filter.



OLIVER PRECOAT FILTER

The Precoat Filter, essentially a clarifying unit, operates with a pre-formed filtering medium or "precoat", usually diatomaceous earth. Solids which would plug filter cloths or be difficult to discharge from conventional drum filters form a layer on the surface of the precoat as the drum rotates through the pulp. At the discharge point the film of solids is continuously shaved off by a knife edge geared to travel slowly inward. A fresh surface of filter aid is thus presented at all times for cake formation. The cake, as it comes off, usually has some of the "precoat" mixed with it.

These two Oliver Filters have been developed to handle pulps producing just such filter cakes. The choice depends to a large extent upon density of the pulp and character of the solids. With both, washing of the cake is practicable.

For most operations, the standard Oliver Continuous Vacuum Filter will form and discharge cakes satisfactorily. The Continuous Precoat and Continuous Panel Filters are for products which form cakes with sticky, slimy, "hard to discharge" solids. Both filters are available in a wide range of sizes.

OLIVER UNITED FILTERS INC.

New York 18, N. Y.
33 West 42nd Street

San Francisco 11
California

Chicago 1, Illinois
221 N. LaSalle Street

Western Sales Division
Oakland 1, California
2900 Glascock Street

Canada:
Sales & Manufacturing Representative
E. Long Limited, Orillia, Canada

Factories: Oakland, Calif. - Hazleton, Pa.
Orillia, Canada - Melbourne, Australia

The **SOLUTION** *to many difficult Problems in Research and Plant Laboratories Has Resulted from the Application of the New*

CHARLOTTE
COLLOID MILL

MODEL N. D. 1 . OPEN FOR INSPECTION

A Sturdy, Compact Machine for Laboratory and Small Commercial Operation.

Patterned After the Larger Models, It Is Precision Built for Constant Operation, and Is Sturdy and Rugged in Construction. Readily Cleaned and Sterilized.

The Charlotte Colloid Mill is well known in the *Chemical, Pharmaceutical, Cosmetic, Food* and other fields, where it is daily proving its value to these and other industries.

Wherein *Emulsion, Homogenization, Disintegration* or *Thorough Blending* are necessary and desirable, there is no machine that can accomplish more, and still give *continuous production* with consequent saving in production costs and floor space.

For a Thoroughly Blended, Homogeneous Product, with a finer texture, use the CHARLOTTE. We know that you will be well satisfied with its performance as have so many others.

The Charlotte Colloid Mill is manufactured in sizes ranging from 1 h.p. to 75 h.p.

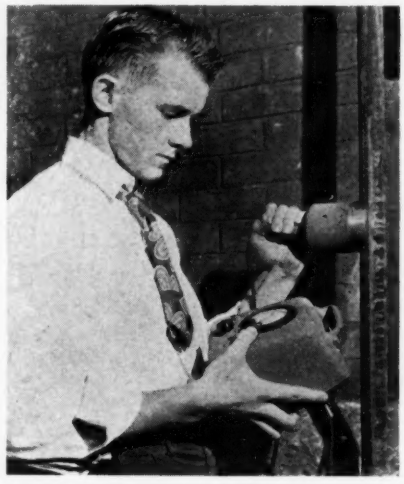
Send for descriptive catalog.

CHEMICOLLOID LABORATORIES, Inc.

44 WHITEHALL STREET
NEW YORK 4, NEW YORK

Thickness Gage QB 176

The new thickness gage of the General Electric Co. measures the thickness of iron or steel pipes from the outside. Called



a pipe thickness gage, Type MS-A, the new instrument can be used on pipes up to ¼ in. in thickness and from 1 to 2 in. in diameter. Applications include checking the safety factor of pipes and tubing carrying petroleum products, chemicals, steam, or gas.

The new thickness gage consists of an indicating instrument, a gage head, and a saddle which is connected to the gage head by two screws. A different saddle is required for each diameter of pipe. To operate, the saddle is placed upon the pipe, and thickness is indicated in fractions of an inch on the indicating instrument.

The gage measures the average thickness of a pipe over an area of several square inches. Accuracy of plus or minus 1/64" can be obtained on clean surfaces, and 1/32" on dirty surfaces. Dirt, scale, and paint on the inside of a pipe do not add to the thickness reading. The gage head and saddle combination weighs about 6½ lb. The instrument operates on 115-volt, 60-cycle power.

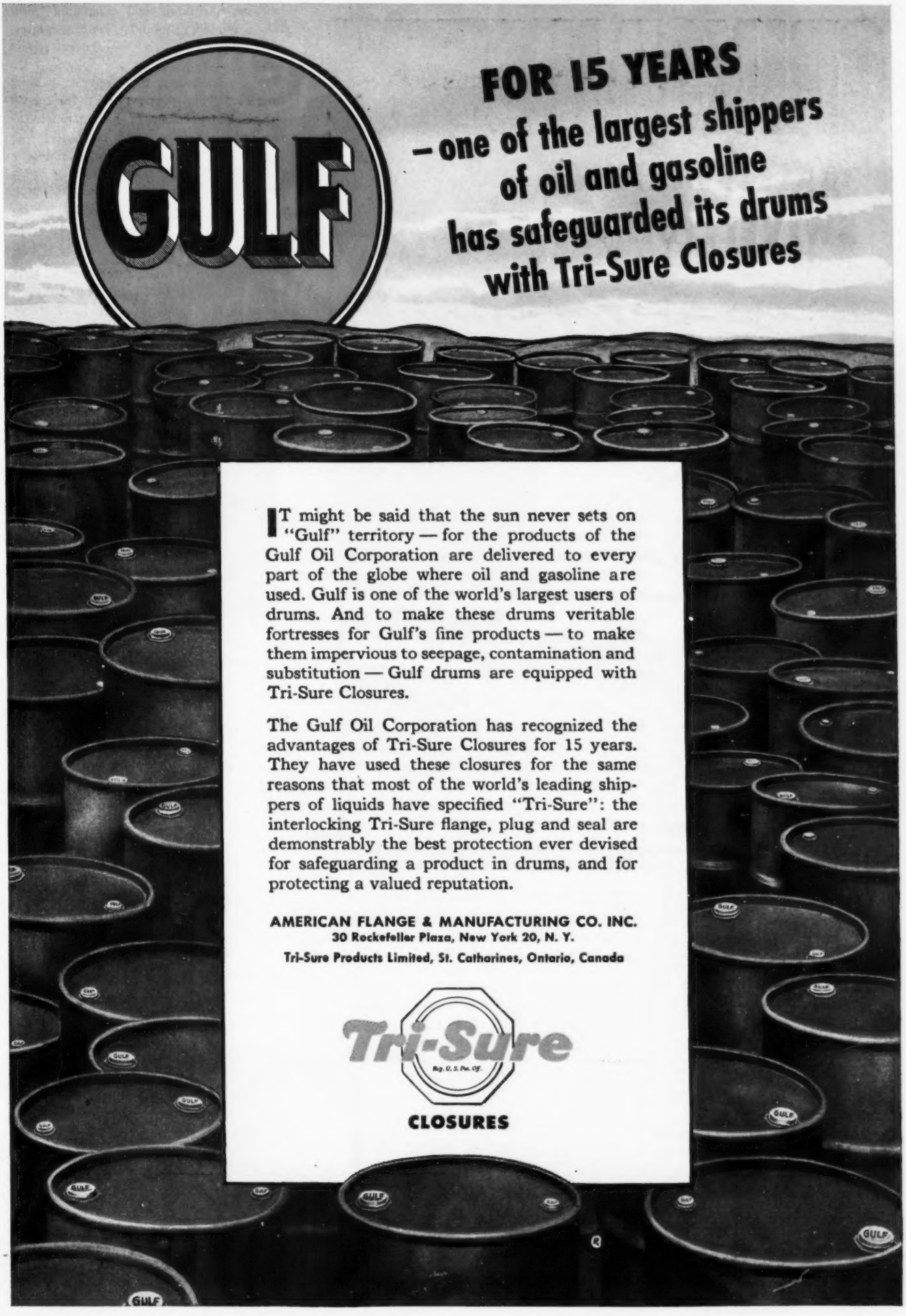
Power-Driven Oil Burner QB 177

This new, self-contained "Aeroil-Schramm" power burner of Aeroil Products Co. consists of an engine and compressor unit working with tank and burner equipment.

Two types of burners are provided on this unit making it possible to work in a vertical as well as horizontal position without affecting the volume or density of the flame.

By regulating the air and fuel valves, any type and length of flame can be produced—six inches to fifteen feet long. The new type of burner designed by Aeroil requires no special fuel—it will operate on kerosene or any oil up to a No. 3 fuel oil.

This model was originally designed for agriculturists, highway engineers, and railroads, it can be used for straightening,


GULF
FOR 15 YEARS
– one of the largest shippers
of oil and gasoline
has safeguarded its drums
with Tri-Sure Closures
IT might be said that the sun never sets on "Gulf" territory — for the products of the Gulf Oil Corporation are delivered to every part of the globe where oil and gasoline are used. Gulf is one of the world's largest users of drums. And to make these drums veritable fortresses for Gulf's fine products — to make them impervious to seepage, contamination and substitution — Gulf drums are equipped with Tri-Sure Closures.
The Gulf Oil Corporation has recognized the advantages of Tri-Sure Closures for 15 years. They have used these closures for the same reasons that most of the world's leading shippers of liquids have specified "Tri-Sure": the interlocking Tri-Sure flange, plug and seal are demonstrably the best protection ever devised for safeguarding a product in drums, and for protecting a valued reputation.
AMERICAN FLANGE & MANUFACTURING CO. INC.
30 Rockefeller Plaza, New York 20, N. Y.
Tri-Sure Products Limited, St. Catharines, Ontario, Canada
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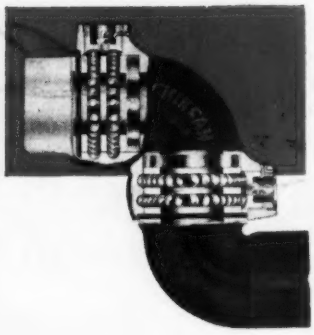
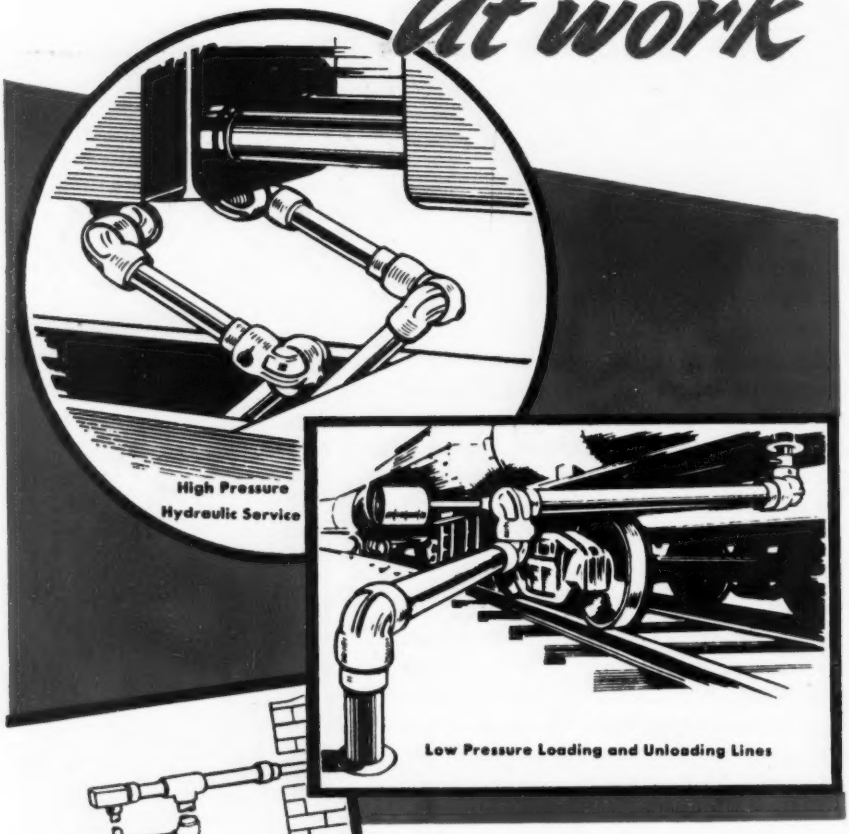
CLOSURES

CHIKSAN



BALL BEARING SWIVEL JOINTS

At work



Look around you and you will see CHIKSAN *Ball-Bearing* Swivel Joints at work in many different applications ... from low pressure loading and unloading lines to high pressure hydraulic equipment and under high temperatures on boilers and open hearth furnaces. CHIKSAN Swivel Joints are made in over 500 different Types, Styles and Sizes... for pressures from 300 psi to 12,000 psi and temperatures to 500° F... for full 360° rotation in 1, 2 and 3 planes... with threaded or flanged ends or bored for welding. Write for CHIKSAN CATALOG No. 45.

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EXPORT REPRESENTATIVE: CHIKSAN EXPORT CO., BREA, CALIFORNIA

Branches: New York 7, Houston 2

CHIKSAN

BALL BEARING SWIVEL JOINTS FOR ALL PURPOSES

CHIKSAN COMPANY

BREA, CALIFORNIA

New York 7 Houston 2

bending, shrinking, and expanding; skin drying foundry moulds, heating plates, ribs, girders, etc., and for general repair work.

When necessary, this machine can be used as a "dual purpose" unit, for the 30 cu. ft. displacement of air is ample to run the majority of small air tools. The skid model can be mounted on a highway truck, and with the addition of a pressure tank and spray bar can be used to spray emulsions and concrete curing materials.

Filter Press QB 178

A new vertical stack filter press of cast iron construction that combines plate and frame in one casting to permit easy re-

moval of cakes has been developed by the Youngstown Miller Co., subsidiary of Walter Kidde & Co., Inc.

The combination of plate and frame enables quick and easy cleaning and removal of cakes through an individual latching arrangement of each frame. Starting with the top frame, each section is individually latched in an elevated position to permit the filter paper and cake to be pulled forward out of the press. The cake is quickly removed and the filter paper replaced. Frames are then relowered into position and tightened by a hand screw, forming a tight press. The filtering area is 31 square feet with two cubic feet of cake space.

Printer-Developer QB 179

The model 91 BW Volumatic printer-developer of Chas. Bruning Co. requires

only one operator and will handle either cut sheets or roll stock up to 42" wide at speeds up to 30' per minute.

More than a Century ... OF MAKING VALVES ... and valves only

More than 100 years ago the Wm. Powell Company dedicated itself to the making of valves—*and valves only*. Thus Powell pioneered in the field of specialization long before the "age of specialization" arrived.

The soundness of this policy, backed by continual scientific advancement and the ability to meet every new demand as it has arisen, is attested by the high quality of Powell Valves today.

The Powell Line is so complete that there's a Powell Valve—*in Bronze, Iron, Steel, Pure Metals* or *Special Alloys*—to satisfy every known flow control requirement in every branch of modern industry.

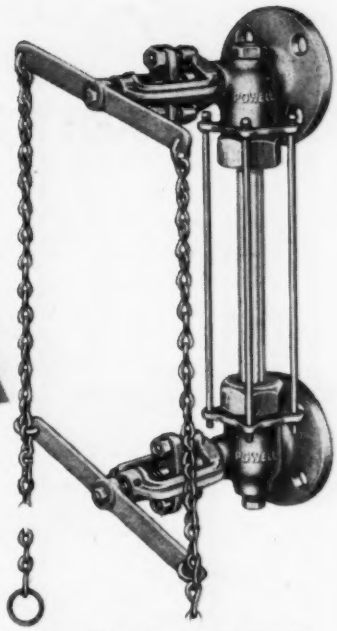

Fig. 1891 Q. O.—Flanged end, O. S. & Y. Liquid Level Gauge. Offset pattern. Has quick opening thread on stem and cross levers for chain operation. For 150 pounds W.W.P.

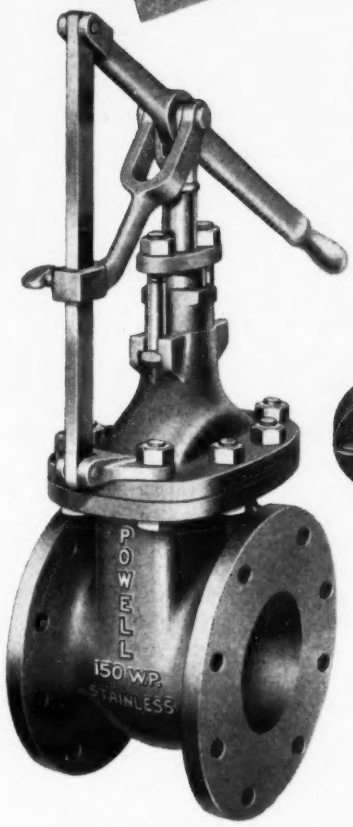

Fig. 2465-G—Stainless Steel Quick Opening Gate Valve with flanged ends, sliding stem and bolted flanged yoke.

Fig. 2315—Stainless Steel Flush Bottom Tank Valve for metal tanks and auto-claves with steam jackets.

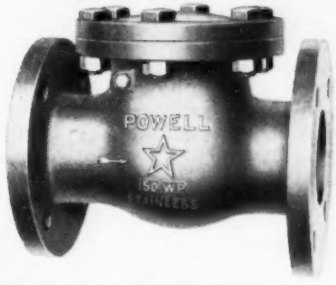

Fig. 2433 — Flanged End Stainless Steel Swing Check Valve for 150 pounds W.P. Bolted cap.

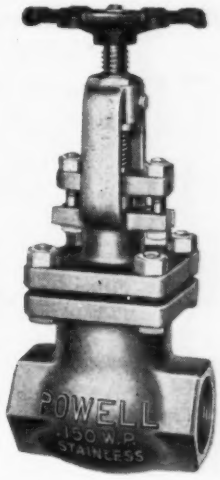

Fig. 1968 — 150-pound Stainless Steel Gate Valve with screwed ends, outside screw rising stem, bolted flanged yoke-bonnet and taper wedge solid disc.

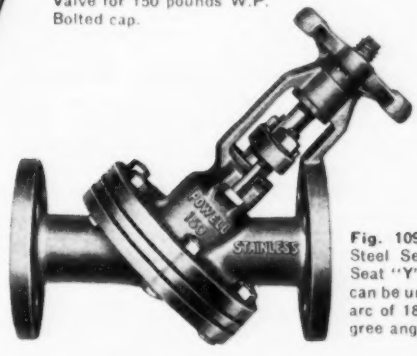

Fig. 1097 — 150-pound Stainless Steel Separable Body, Reversible Seat "Y" Valve. Lower half of body can be unbolted and turned through arc of 180 degrees to make 90-degree angle valve.

The Wm. Powell Co., Cincinnati 22, Ohio

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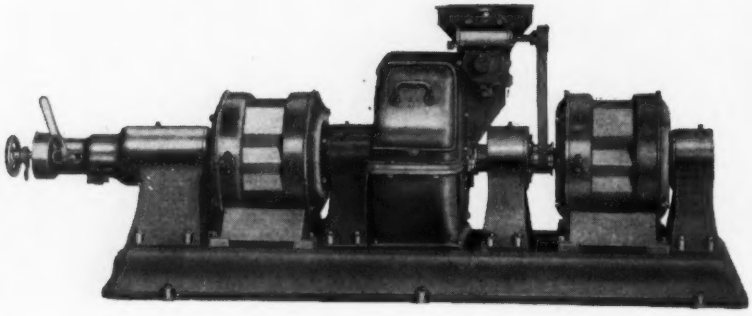
POWELL VALVES

FAMILIARITY BREEDS "RESPECT"



FOR THE SPROUT-WALDRON ATTRITION MILL

Chemical processors familiar with the Sprout-Waldron Attrition Mill know and respect it for its efficient and economical performance. Seven salient features make it "America's most profitable grinder"—

1. **Minimum Power Consumption.** Ammeter readings show that this mill, due to its perfectly balanced heads carried on four heavy ball bearings, consumes 15 to 30 per cent less power than any other type of grinder.
2. **Needs No Tramming.** Positive ball bearing construction does not permit mill to get out of alignment.
3. **Dust Proof Bearing Construction.** Special design and precise machining of bearing cases means lubrication necessary only once or twice a year.
4. **Easy to Operate and Maintain.** All parts made to template facilitating easy, inexpensive replacement.
5. **Quick Access to Grinding Plates.** Access to grinding plates for examination or removal possible by simply removing shell door and releasing the lever on adjusting end.
6. **Adjustable While Running.** Turning the hand wheel while the mill is running sets the plate clearances for fine or coarse grinding, as desired.
7. **Requires Minimum Attention.** It has no screens, pins, hammers or other troublesome parts that require constant attention and mean loss of valuable operating time.

Look to Sprout-Waldron for money-saving processing equipment and advice.

Consultants First . . . . Then Manufacturers

SPROUT-WALDRON & COMPANY

Manufacturing Engineers

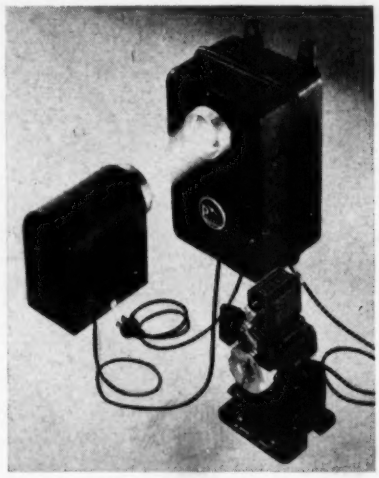
MUNCY **PENNSYLVANIA**

All electric motors and heaters are controlled by an on-and-off push button control. Speed and light shield control knobs enable the operator change the printing speed and the light exposure.

No plumbing or venting is required.

Photoelectric Counter QB 180

The new photoelectric counter, Type P1, of Photoswitch, Inc., consists of a photoelectric control, light source, and electric counter. The only equipment



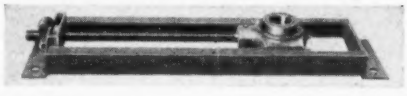
which needs to be located at the point-of-count is the control and the light source. One or more electric counters (containing the counter face and reset knob) may be placed at any convenient location and wired to the control.

No wiring is necessary and the control has a line cord with a male plug connection which fits any standard lighting outlet. This supplies the power for the light source and electric counter, which in turn have cables and plugs for plug-in connection to the control.

The counter plugs into any 115 volt 60-cycle A.C. outlet. It can count up to 600 counts per minute with a maximum distance of 6 ft. between the photoelectric unit and light source. The maximum count reached before returning to zero is 99,999.

Conveyor Take-Up QB 181

The new steel frame ball bearing take-up for conveyor service of Dodge Manufacturing Corp. incorporates the Dodge SC ball bearing take-up unit consisting



of a ball bearing inner unit enclosed in a cast iron housing provided with ways on each side for supporting guides. The housing has a hole for receiving the unthreaded end of an adjusting screw.

The take-up has a welded steel frame. Adjustment is accomplished by turning

where processing calls for . . .

KETTLES · COOLERS
HEAT EXCHANGERS · CONDENSERS
AUTOCLAVES · COLUMNS

or other type of equipment involving the transfer of heat.

Call on PATTERSON-KELLEY

PATTERSON-KELLEY
Heat Exchangers
AND
Process Equipment

Equipment of this kind is our specialty...has been, in fact, for many years. We are staffed with competent engineers to help design units to meet your requirements if our standard units do not fit the picture. Our engineers understand processing and the practical application of the principle of heat transfer.

And we have the manufacturing facilities and the skilled workmen to produce exceptionally well-made heat-transfer units such as listed above.

THE PATTERSON-KELLEY *Company, Inc.*

112 WARREN STREET, EAST STROUDSBURG, PA.

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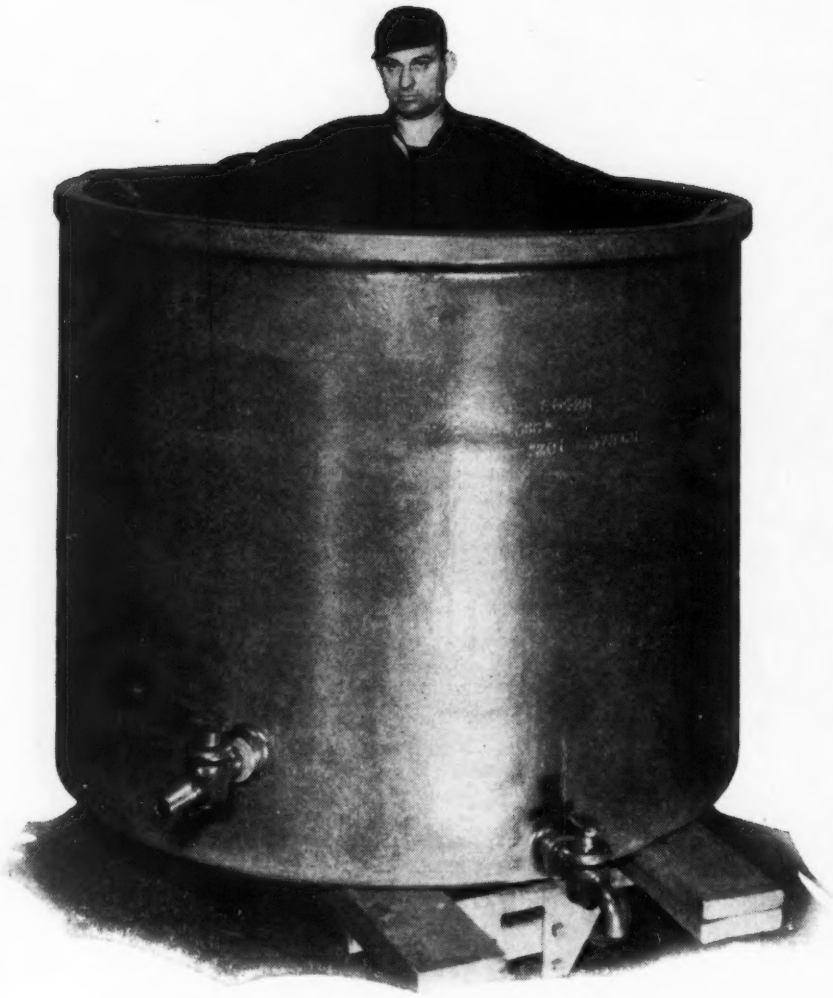


One Gal. to 600 Gal. Jars

Knight makes nearly every size and shape of jar for use in the chemical process industries. Each piece is acid-proof throughout its entire body.

The above photo shows a 575-gallon straight side jar for storing and mixing chemicals. It is shallower than our standard 500-gal. jar. Knight-Ware jars are made in capacities from one to 600 gallons. Outlets can be placed where desired.

Whether your interest lies in jars, laboratory equipment, filters, kettles, pipe, fittings, valves, tanks or towers, Knight can give you what you want in a standard or special design to exactly meet your needs. Write for Knight-Ware Chemical Equipment catalog.

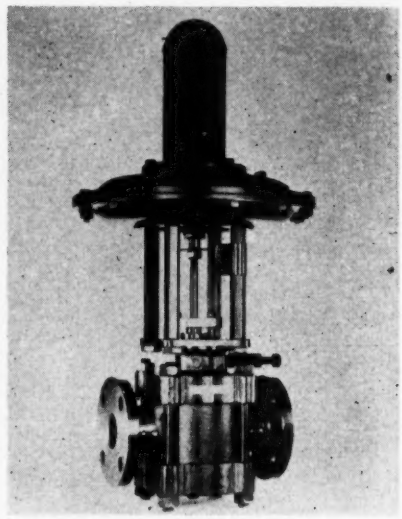
MAURICE A. KNIGHT
203 Kelly Ave., Akron 9, Ohio

KNIGHT-WARE
CHEMICAL EQUIPMENT

the brass capatan-head nut. The adjusting screw is cadmium plated. This take-up is equally strong in tension or compression. It is available in shaft sizes from ¾″ to 2 7/16″ inclusive.

Diaphragm Motor Valve QB 182

The new valves of the Fischer & Porter Co., to be known as "The Valvrator Line", incorporate the dished-bonnet con-



struction with flush-seated bodies and through-bolts. No bonnet flanges are included in the body construction . . . and the design results in a compact unit with the lowest possible weight, simplified cleanout characteristics and the possibility for fabrication in nearly all corrosion resisting materials. Body materials such as iron, bronze, stainless steel, carbon steel, hard lead, haveg, hard rubber, monel, hastelloy and porcelain are available.

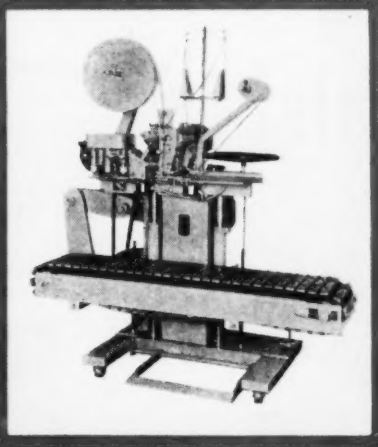
The valve is made only in 150 lb. construction in sizes from ¼″ to 1″ screwed, and from 1″ to 3″ flanged.

Temperature Controller QB 183

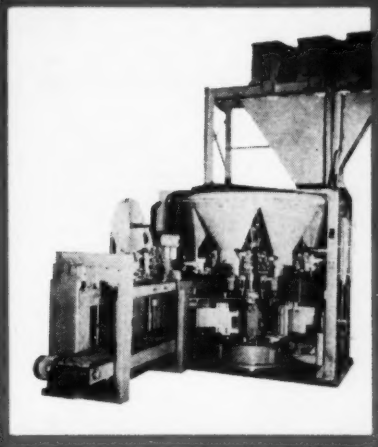
The new low-cost Electromax temperature controller of the Leeds and Northrup Co. signals and controls only, although temperature readings can be taken manually with it at any time.

The instrument consists of a Wheatstone bridge circuit with a vacuum-tube amplifier as the detector. Vacuum tubes are standard, easily-purchased types, require no matching, balancing or other special selection. It's completely A-C operated—needs no dry batteries or standard cells. The lack of indicating or recording mechanism makes it a practically "zero maintenance" instrument.

The temperature-sensitive elements used with Electromax are Thermohms, L&N resistance thermometer bulbs. As with other L&N instruments, the length of leadwires does not affect calibration,

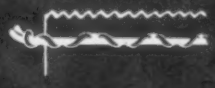


MODEL "DA" (portable)—One operator filling and closing, can handle 2 to 4 100-lb. bags a minute . . . 6 to 12 a minute where filled bags are delivered to BAGPAKER conveyor (quickly adjustable for various bag sizes). Starting and stopping of sewing operation is automatic . . . no tape wasted.



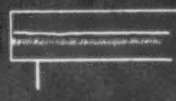
MODEL "A"—Completely automatic—extremely accurate weighing. Saves on "give away" material, labor and bag costs, thus paying for itself quickly. Machine capable of filling and closing 100-lb. bags at the rate of 15 per minute . . . needs one operator.

ALL BAGPAKERS MAKE THIS FAMOUS "CUSHION STITCH"



TAPED CLOSURE IS MOISTURE RESISTANT—SIFT PROOF—INSECT PROOF

Taped closure is effected on models "A" and "DA"



a BAGPAK plan shows how to cut packaging costs...

Are you using the most modern, economical method of packaging your product? Write for a BAGPAKER proposal and find out how our packaging plan can cut costs in your plant. A BAGPAK engineer will gladly discuss your packaging machinery and multiwall paper bag requirements... he'll show you the best methods of weighing, closing and handling.

BAGPAK INC

Sales Representative:
INTERNATIONAL PAPER PRODUCTS DIVISION,
INTERNATIONAL PAPER COMPANY,
220 EAST 42nd STREET, NEW YORK 17

Now—an extinguisher with ALL FIVE fire-fighting essentials!

1. EASE
One-hand operation, from bracket to fire. Randolph "4" means panic-proof protection
2. SPEED
Tests prove Randolph "10" stops 2-gallon gasoline fire in 10 seconds
3. SAFETY
Randolph CO_2 will not conduct electricity And it's non-toxic . . . no poisonous fumes
4. NEATNESS
No mess or stain ... no water or chemical damage with Randolph CO_2
5. EFFICIENCY
Randolph is ready for action under all temperatures. No freezing or deterioration
Randolph "4"
TO OPERATE
1
2
3

ONLY RANDOLPH gives you this multiple protection

Lacking any one of these fire-fighting essentials, your extinguishers cannot give you full protection. They may actually *increase* fire-damage in several ways:

For example, a water-filled extinguisher played on an electrical fire may bring serious electrical shock to the employee using the unit. Again, a complicated, cumbersome extinguisher often confuses and panics the operator . . . causes fatal delay during those first few important moments.

Only in a Randolph do you get the complete all-five combination of fire-fighting essentials. Patented trigger-touch affords ONE-HAND action for ease and speed. Dry, odorless carbon dioxide works with split-second speed, disappears with the fire, will not freeze in cold weather.

Approved by Underwriters' Laboratories.

Randolph Laboratories

8 E. Kinzie Street, Chicago 11, Illinois

SEND FOR NEW FREE DATA GUIDE

Analyze your fire protection needs with this compact slide-rule data guide.

NAME_____

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and the location of Thermohms can be changed whenever desired.

The instrument case is 11 9/16" x 11 1/16" x 9 1/16" and can be mounted wherever convenient. Standard ranges are 0° to 250° F. and 0° to 1000° F. or the corresponding ranges of 0° to 150° C and 0° to 550° C.

Tube Cleaner Motors QB 184

The two new jet motors for tube cleaning of the Elliott Co. are driven by air and water respectively. The air jet motor (right) can be adapated to operate with steam.

The Roto air jet motor has only two

moving parts, a shaft and a blade, and is said to develop 100-250% more power than previous designs while air consumption is reported to have been decreased some 60%.

The Roto water jet motor (left), although less powerful than the Roto air jet, exhibits a radical design change in the turbine wheel and other parts. Power has been increased more than 100% and water consumption per horsepower reduced as much as 80% on one of the smaller models.

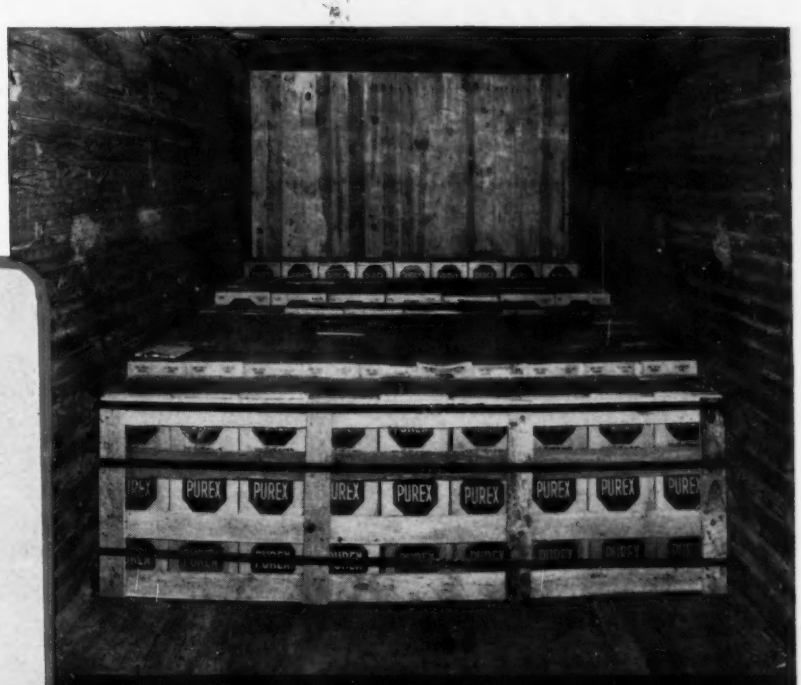
Water Vapor Indicator QB 185

The new water vapor indicator of the American Instrument Co. measures the water vapor content of compressed gases and, with a slight modification in procedure, it can be used for gases at or below atmospheric pressure. The new instrument measures the vapor content from saturation down to 0.001 mg. per liter, and measurements are reproducible to 0.002 mgs. of water per liter. 2-5 minutes are all that are required for a determination on a sample of 0.1 cu. ft.

Solenoid Valve QB 186

The new Type SV-11 solenoid valve of the Henry Valve Co. is designed for small capacity installations. Incorporated in a standard outlet box, it can be quickly mounted through screw holes provided

Call in a Specialist!



BOTTLED CHEMICALS IN CARTONS: Bulkheaded by the Signode method

CHEMICALS IN DRUMS: This is a wall anchored load using 1¼" x .035 Signode Steel Strapping

If you have a "tough" shipping problem, the chances are good that SIGNODE principles of PLANNED PROTECTION in the application of steel strapping will be the answer. Call the office nearest you. A qualified Signode packaging and carloading engineer is ready to serve you promptly. SIGNODE STEEL STRAPPING COMPANY, 2662 N. Western Avenue, Chicago 47, Illinois; 395 Furman St., Brooklyn 2, N. Y.; 481 Bryant St., San Francisco 7, Calif. Branches in 21 Principal Cities.

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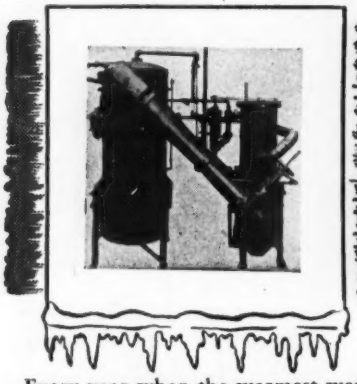


ORDER YOUR CHILLVACTOR NOW For Chilled Water Next Summer

Every year when the warmest weather comes in July and August, we have several frantic appeals from production men in chemical and process industries for CHILL-VACTOR equipment to maintain proper temperatures in certain solutions, in chilled water for air conditioning, for chilling various reaction vessels, and for special cooling requirements.

The Croll-Reynolds CHILL-VACTOR is one of the most dependable and efficient units available for cooling requirements in the range above 32°F. While there are a great many outstanding advantages, there are a few limitations. In recent years the most serious one seems to be the fact that these units are not made in quantity and available for immediate shipment. While they are mostly made from standard parts, each unit is custom built to a certain extent in order to provide maximum dependability and efficiency under individual operating conditions.

Under present manufacturing schedules, it requires approximately three months to design, build and ship a complete CHILL-VACTOR unit. This means that *immediate* action is advisable for those who want to be ready with new cooling capacity for the next warm weather season.

The Croll-Reynolds CHILL-VACTOR has no moving parts other than a standard chilled water circulating pump. Water is the only refrigerant. Maintenance and repair costs are therefore practically nil. Operating costs are usually less than for other types of refrigerating equipment where ample condenser water is available. Inquiries on this type of equipment will receive the careful attention of engineers with many years specialized experience in this field.

CROLL-REYNOLDS CO.

17 JOHN STREET, NEW YORK 7, N. Y.

CHILL VACTORS STEAM JET EVACTORS CONDENSING EQUIPMENT

CROLL-REYNOLDS

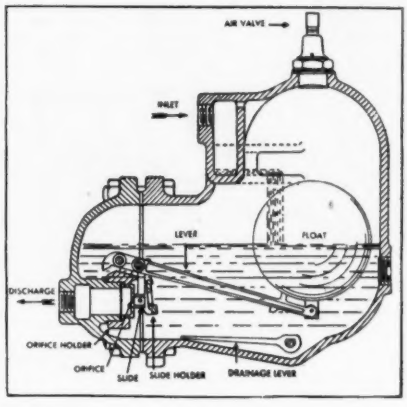
and electrical connections can be easily made by utilizing one of three knock-outs in outlet box. The coil can be removed and replaced without disturbing electrical connections to thermostat or other electrical devices. Efficient magnetic circuit provides low current consumption and "floating plunger" insures quiet operation.

The Type SV-11 meets all requirements of the Underwriters Laboratory and it is furnished with ⅜" FPT connections in following standard voltages: 115 volt, 60 cycle, and 230 volt, 60 cycle. The Type SV-11 solenoid valve can also be mounted in approved metal enclosure, less outlet box.

Lock nuts are threaded on body for mounting. It is also available with larger outlet boxes where multiple electrical terminals are required.

Steam Trap QB 187

In the new steam trap of the W. S. Rockwell Co. the outlet valve is self-



sealing, being operated intermittently by the condensate, not intermittently by the steam. The sliding valve mechanism by which this is operated automatically compensates for wear, continuously freeing the valve orifice of sludge or other foreign matter in the line by its cutting action in a vertical plane against the orifice.

As shown in the figure the steam condensate mixture enters the trap through the condensate and falls through two channels on both sides of the float in the housing. The slide valve moves over the orifice with the change in position of the float. There can be no short-circuiting of steam in opening or closing the discharge valve. The continuous flow permits use of a smaller trap.

Dipping Equipment QB 188

Two new groups of indirectly heated, fully insulated, thermostatically controlled melting tanks have just been developed by Aeroil Products Co.

These new tanks are built on the double boiler principle to insure complete uniformity of accurately controlled temperature. Built-in thermostatic controls hold temperature rigidly at any desired point

About 3/1000 of a cent's worth of very important material

That's the cost of the little film of lining compound inside the seam on each end of a can.

You've probably never realized it's there, because it's sealed *inside* a double interlocking seam—performing the very important function of closing the last possible microscopic opening.

Many years of scientific research have gone into that lining compound.

It *has* to be good! It may have to withstand acid, alkali, alcohol, fat, oil, water, steam, heat, cold, air, pressure, and the aging process.

Of course, no *one* compound can serve all uses. The Central Research Laboratories of American Can Company have perfected many lining compounds in more than 35 years of research.

Not infrequently we have to make experimental packs of a new product to prove the effect of product and lining compound on one another.

Almost all compounds used to be based on latex rubber—but the war forced us into intensified synthetic rubber research—and we finally came up with some synthetics which proved superior to pre-war compounds.

Lining compounds are just one of the many research projects which we undertake. Why? Because it's our business to demonstrate daily that . . .

NO OTHER CONTAINER PROTECTS LIKE THE CAN

American Can Company

CANCO

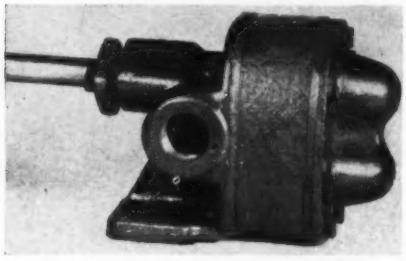
NEW YORK · CHICAGO · SAN FRANCISCO

from 100° to 550° F. in fully insulated units.

Both gas-fired and electrically heated equipment are available. Gas-fired units are heated from the inside by means of a patented immersion tube system. The electrically heated equipment is available in both 40 gal. installations (equipped with heating elements of 13-KW total capacity) and smaller portable 15 gal. capacity tanks.

Rotary Pump QB 189

A new line of general service rotary pumps, the GA Rotary type, of the Worthington Pump and Machinery Corp.



is available in various mountings for capacities up to 51 g.p.m. and 100 p.s.i.

Design features include four bearing construction and special herringbone rotors. Built-in pressure lubrication eliminates all external lubrication and the danger, prevalent in many industries, of liquid contamination.

Models are available footmounted or flange mounted with adjustable stuffing box and mechanical seal. They are also available with or without oversize unloader type relief valve. All models are suitable for direct coupling to electric motors of any make.

Circuit Breaker QB 190

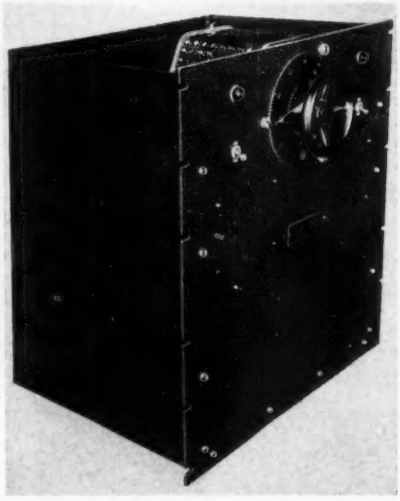
The new Quicklag circuit breakers of the Westinghouse Electric Corp. provide a new tripping action which combines the inverse time limit characteristics of Bimetal thermal action on overloads with the operating speed of magnetic trip action on short circuits.

Available in single or double pole, 10 to 50 amperes, 125 to 125/250 volts AC, the new breaker provides another important improvement, a redesigned "Deion" arc chute that eliminates the need for a vent screen in the bottom, thereby permitting mounting flush to pan. This eliminates need for the ⅜-inch mounting clearance formerly required.

Of primary importance to circuit breaker users is the fact that the new Quicklag will not require retooling or redesigning existing fabricating facilities as the overall and mounting dimensions are the same as for the older Quicklag.

DC Power Supply QB 191

This 0-3000 volt DC power supply of the Superior Electric Co. has been designed for continuous duty, small regulation and easily adjusted output voltage. The maximum DC output current is 0.5



amperes. It operates from a 115 volt, single phase, 50/60 cycle source.

The power supply uses a full wave bridge rectifier consisting of four type 866/866A tubes. A time delay relay is provided which allows the filaments to be adequately heated before high voltage is applied. Line fuses are incorporated for protection against possible overload conditions. All major components are either potted in metal enclosures or are hermetically sealed.

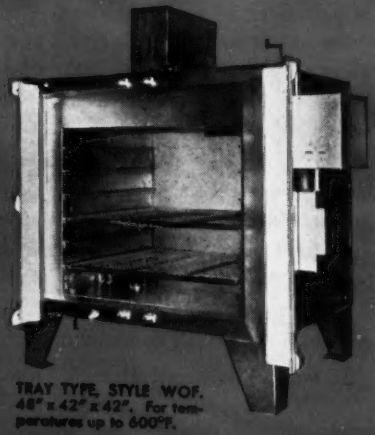
"Folded-and-Formed"
For Greater Efficiency . . .
Longer Life . . . Lower Cost!

Only TRENT ELECTRIC OVENS

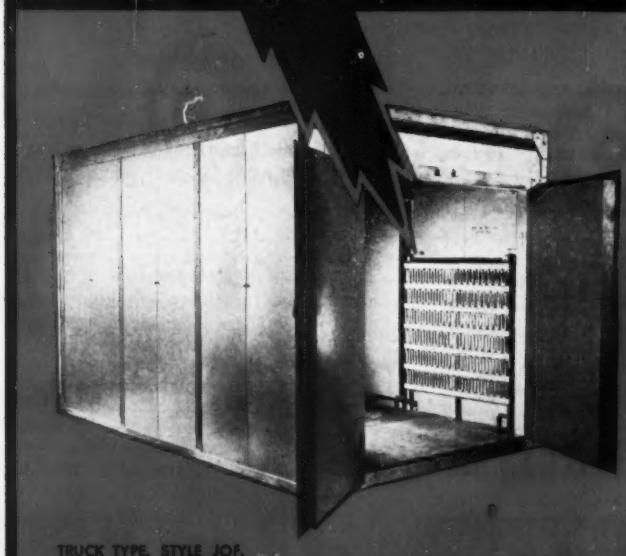
give you the all-important advantages of "Folded-and-Formed" Heating Elements: Top temperature of 2000° F. Quick rise to temperature and constant temperature uniformity. No-burn-outs. *Minimum maintenance*, chiefly because there are no internal connections; no multiplicity of lead wires; and the wide margin of safety between operating temperature and maximum temperature of heating elements.

BAKING, DRYING
HEATING, CURING

are performed with efficiency and economy in these TRENT Ovens. The large truck type unit has a variety of uses, including chemical processing, armature and core baking. The smaller tray type oven is used for pilot plant or laboratory work. Both are available in a wide range of sizes and in special designs to meet specific requirements. Durable all-steel construction. Complete automatic controls. *Write for Bulletin 71-TB.*

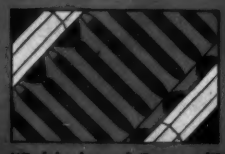


TRAY TYPE, STYLE WOF.
48" x 42" x 42". For temperatures up to 600°F.



TRUCK TYPE, STYLE JOF.
6' x 6' x 10'. For temperatures up to 700°F.

View shows bank of "Folded-and-Formed" Heating Elements exposed.



"Folded-and-Formed"
(Reg. U. S. Pat. Off.)

TRENT INC.
Electrically Heated Industrial Equipment
235 LEVERINGTON AVE. PHILA. 27, PA.

Step 1
OBJECTIVE - - - ACID PLANT

The first step in the construction of a Sulphuric Acid Plant usually is an informal discussion with a CHEMICO engineer. The outgrowth of that preliminary conference is a complete unit . . . in full operation . . . exactly the type of plant you want, whether it be an acid production, concentrator or recovery unit.

Chemico-built acid plants are individually designed to meet the particular requirements imposed by geographic location, economic availability of heat and steam, nature of the raw materials to be used, and existing facilities. These plants are tailor-made . . . designed for economy in production and easy maintenance.

One contract . . . a single responsibility . . . an overall guarantee of performance backed by 32 years of specialized experience . . . these are your assurances of complete satisfaction when you come to CHEMICO. Your inquiry is invited. Take this first step. There is no obligation, of course.

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Cables: Chemiconst, New York

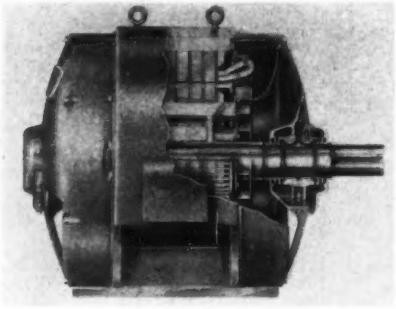
CC-135

CHEMICO *plants are profitable investments*

As shown in the illustration, the unit is supplied for mounting in a standard 19 inch relay rack panel. An external metering panel is available. Three controls and two indicator lamps are mounted on the power supply panel. These are the AC line switch with indicator lamp; high voltage primary switch with indicator lamp; and the variable transformer control.

Squirrel-Cage Induction Motor QB 192

The new "Heavy-Duty" squirrel-cage induction motors of the Electric Machinery Mfg. Co. are available for large-power drives from 100 to 1000 hp., 1800 rpm. and lower speeds.



The fabricated steel frame shuts out falling particles, providing drip- and splash-proof construction. Inspection and blowing out is simplified on larger ratings with access plates designed for speedy removal, replacement. The sealed bearings can be cleaned and refilled without motor disassembly. Double end ventilation is provided by a blower on each end of the rotor. Starting characteristics are NEMA Class B (normal torque, low starting current), for across-the-line starting.

Caster QB 193

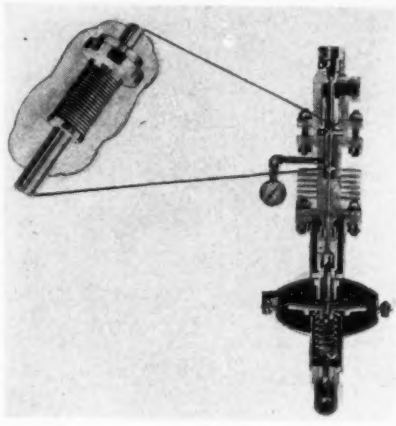
The new caster of the Aerol Co. features a heavy duty shake proof king pin, labyrinth dirt seal to protect lubricated bearings, and extra offset for instant trailing. Light, aluminum alloy cuts down dead weight without sacrificing strength requirements. Precision construction of the wheel assembly and the use of Timken tapered roller bearings on the race assure straight, even tracking and sensitive swivel action even under heavy loads.

Aerol casters come with tough, all-purpose solid rubber tires that resist oil and water and are guaranteed not to separate from the wheel core.

Packless Diaphragm Control Valve QB 194

Stuffing boxes have been eliminated from the 3000 B series of packless diaphragm control valves of the Hammel-Dahl Co. This design can be applied to any size or type of Hammel-Dahl control valve for a pressure of 500 psi at any temperature from 70-750° F.

The packless bellows sealed construction is housed in a unit assembly and replaces the conventional valve bonnet. The bellows unit is piloted into the valve body and retained between two stainless steel gaskets by the bonnet assembly, being protected from over-ranging by travel stops. A modified packing gland is employed as an emergency seal, a tell-tale gage indicating positively any bellows failure.



The bellows unit is available in type 347 stainless steel and it may be mounted on any size screw end valve from ½" to 1½" and flanged end valve from 1¼" to 12".

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YOUR CHEMICALS, PIGMENTS *etc.*
IN Fulton
WATERPROOF BAGS

Sift-Proof, Moisture-Proof Containers Prevent Loss From Damage

Fulton Waterproof Bags are easy to handle and to store. They are tough and carry well. In many instances Fulton Waterproof Bags are replacing metal drums and other more expensive containers with entire satisfaction. Write our plant nearest you for full information.

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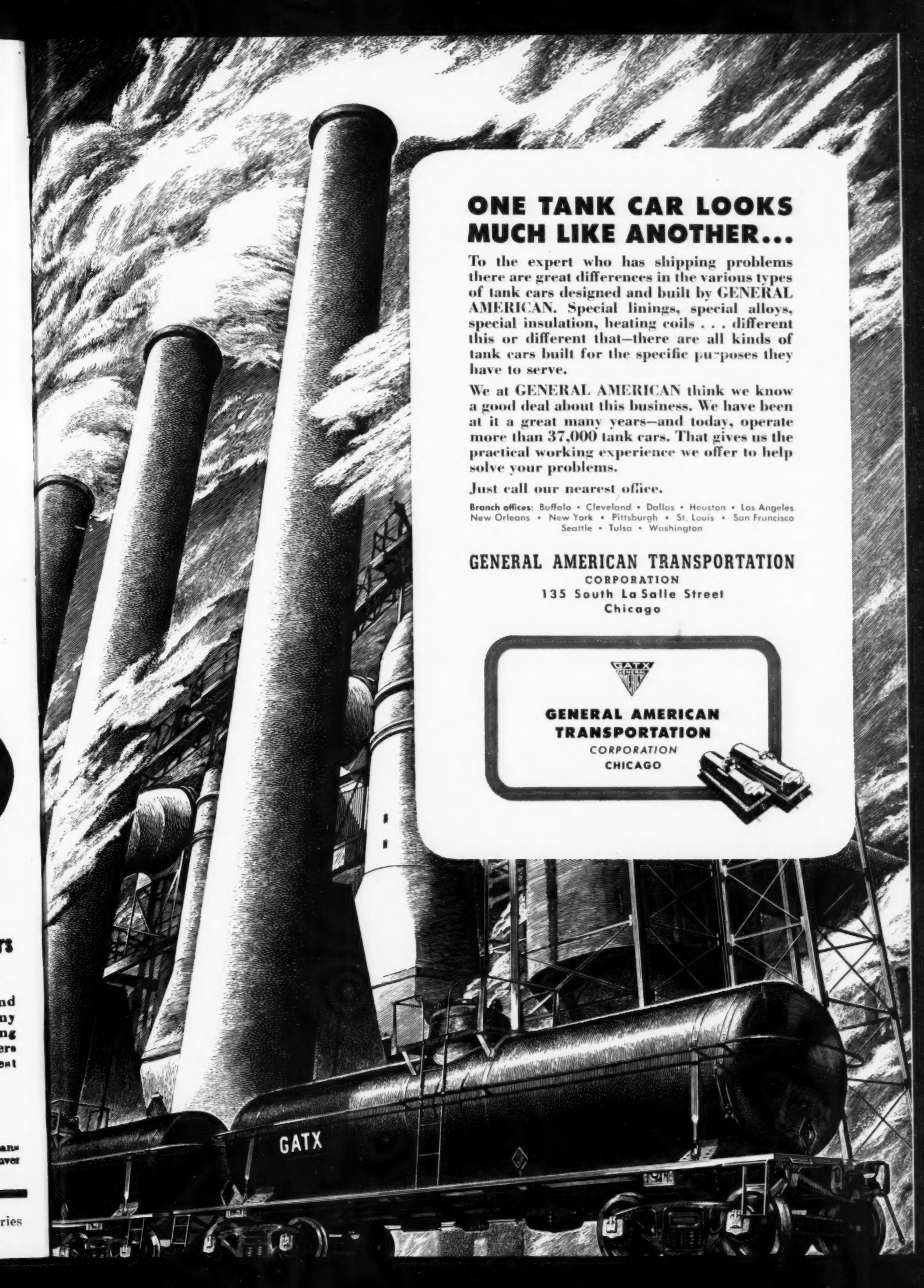

ONE TANK CAR LOOKS MUCH LIKE ANOTHER...

To the expert who has shipping problems there are great differences in the various types of tank cars designed and built by GENERAL AMERICAN. Special linings, special alloys, special insulation, heating coils . . . different this or different that—there are all kinds of tank cars built for the specific purposes they have to serve.

We at GENERAL AMERICAN think we know a good deal about this business. We have been at it a great many years—and today, operate more than 37,000 tank cars. That gives us the practical working experience we offer to help solve your problems.

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PACKAGING & SHIPPING

by T. PAT CALLAHAN

Shipping Research Needed

OF PARTICULAR interest to shippers of dangerous chemicals is the speech delivered by Robert T. Baldwin, treasurer of the American Chemical Society, at a meeting of the Louisiana Section of the Society at Tulane University. Mr. Baldwin is well known throughout the chemical fraternity due to his long association with the American Chemical Society, and his remarks are the culmination of many years of practical knowledge within the chemical industry.

Mr. Baldwin declared that all present equipment for shipping dangerous substances can be made obsolete in a few years if the available research tools are applied to the problem. Mr. Baldwin maintained that federal regulations and specifications are not perfect and could be improved upon by more fundamental research. He appealed to all chemists and chemical engineers to give attention to the complex subject of safe transportation, pointing out that the problem definitely lies within the field of science as well as that of business.

More than 1,000 articles are now covered by the regulations of the Interstate Commerce Commission, as compared with fewer than 250 items a quarter century ago, he pointed out. In 1945 alone, 51 new chemicals and six nex explosives were added. Except for explosives and a few materials such as charcoal, fireworks, and matches, the articles can readily be classified as chemicals.

Transportation of dangerous materials in various types of containers, ranging from bottles to large tank cars, has long been highly organized and carefully regulated by the Federal government, with regard to interstate commerce, and by some states and municipalities with regard to intrastate commerce, he pointed out.

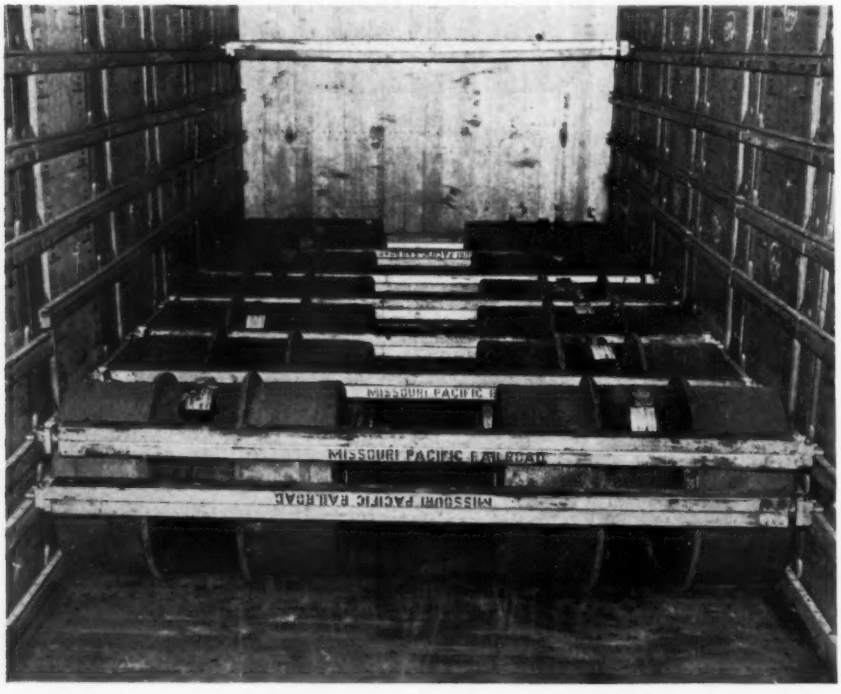
Although most acids are now shipped in steel tank cars, Mr. Baldwin stated, the glass carboy still is used for small shipments.

"A carboy for acid as an entity is not a bad contrivance, and is suitable for most acids, and permitted," he continued. "A carload of carboys, or a few carboys in a box car containing mixed freight, is something quite different. Aside from the fact that some acids may not be shipped in box cars containing certain kinds of freight, it still remains that a carboy in poor order with its contents loose can cause other carboys to unload their contents, and thereby provide damage or fire to other freight and injury to persons. The greatly increased speeds of freight trains, the jolts brought about by reducing speeds for curves, and stops are hard on fragile packages."

"To put the matter briefly," Mr. Baldwin explained, "The aim is . . . to get a strong package that will neither contaminate the article nor suffer corrosion . . ."

The rail carriers, which transport by far the largest part of all explosives and dangerous articles, have a remarkable safety record, Mr. Baldwin declared. In the six years from 1940 through 1945, they transported 65,296,983 tons of military explosives with no loss of life, and although the quantity of poison gases carried by rail during the war has not been disclosed, no injuries or deaths in transportation have been reported.

The Bureau of Explosives, a function of the American Association of Railroads, in its annual report for 1945 listed a total of 1,036 rail accidents during transportation of dangerous articles other than explosives, Mr. Baldwin said. Although 20 persons were hurt, 156 fires were started and property damage of $600,000 was caused, he stated, there were no explosions and no one was killed during the whole of the year.



Steel drums of acid, each containing 110 gallons and weighing 1700 lbs. gross weight, are locked securely in place. No fatalities or explosions resulted from rail accidents during the whole of 1945.

Railroad Pallets Presage New System

A new era in chemical shipping is foreshadowed by the news that railroad has furnished pallets for experimental less-than-carlot shipments.

Palletizing has long been thought of only in the terms of carload quantities. However, recent shipments over the Great Northern Railroad by Bemis Bro. Bag Co. at Minneapolis completed the first movement on railroad pallets in this country, proving the adaptability of the unit load method for L. C. L. freight.

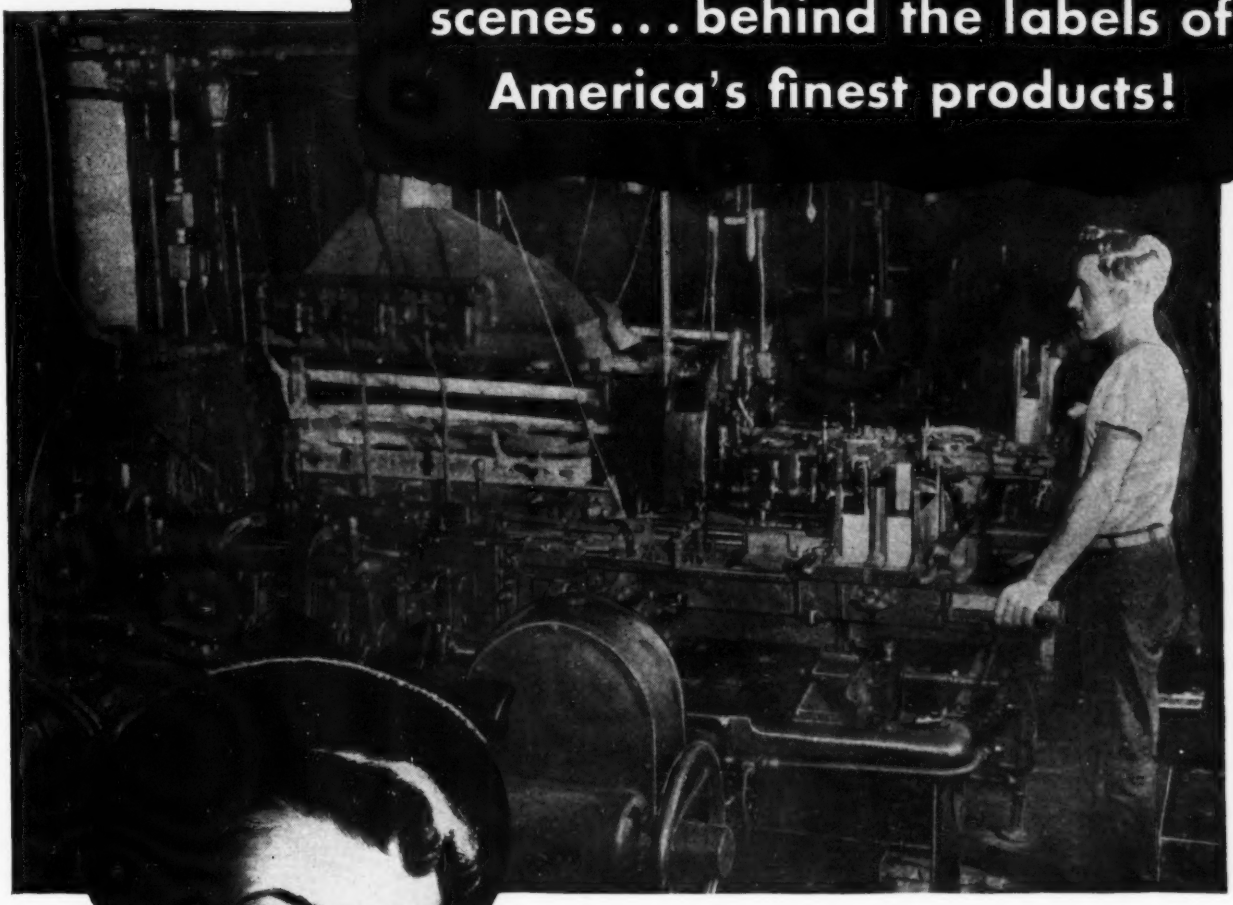
The shipments consisted of wire bound bales of seamless bags. These bales were strapped to the pallets with 6 bands of ¾" .020 steel strapping. The total weight of the load plus the pallet and the strapping was 1950 pounds.

Returnable pallets, furnished by the Great Northern Railroad, were single faced 40" x 48" wood pallets having two outside 4" x 4" stringers and a center 2" x 4" stringer.

The bales arrived in excellent condition and the consignees have expressed their approval of this type of shipment as it has opened to them the savings made possible by unit load handling not only on carload quantities but also for less-than-carloads.

L. C. L. shipments on railroad-furnished pallets have definitely opened a new field for the application of modern materials handling methods. Although the Great

Continental serves behind the scenes . . . behind the labels of America's finest products!



MADE RIGHT! . . . *Two magic words that say, "Here is a quality product."*

That's why "made right" is Continental's proudest claim for its lithographed metal containers. Every step in this manufacture—from selection of raw materials through lithographing, body-forming and seaming—is painstaking and exact. Forty-two years of experience in the field—making more than 500 different shapes and types of containers for thousands of products—have developed our production equipment and manufacturing skill to top efficiency.

Add this to our exacting methods of inspection, testing and checking. Then you'll see what we mean when we say, "Continental cans are *made right!*" That's why thousands of metal container users look to Continental for the best in quality and the best in service.

CONTINENTAL CAN COMPANY

100 East 42nd Street, New York 17, N.Y.

Northern is conducting palletizing experiments at several of its major freight terminals, the service is not yet a standard procedure on this railroad.

Packaging Exposition

American Management Association will hold the sixteenth annual Packaging Exposition concurrently with the American Management Association Conference on packaging, packing, and shipping in Convention Hall, Philadelphia, from April 8 to 11, inclusive. This exposition, largest in its history, will occupy 80,000 square feet, with approximately 150 exhibitors displaying machinery, equipment supplies and services. Trade attendance last year was in excess of 10,000.

The past five years have seen considerable advances in materials for packaging. Machinery for improved speeds and reduced cost has been developed. Although both material and machinery have been in short supply, it is expected that many of the manufacturers will be in a position to take orders for newly developed products when the Exposition opens in April.

Alan S. Cole, general manager of "Modern Packaging," New York, will serve as chairman of the exhibitors' advisory committee for the exposition.

Clapp and Poliak, Inc., will act as exposition management. Arrangements for attendance at the exposition and conference may be made through the exposition management's office at 350 Fifth Ave., New York 1, N. Y.

Multiwall Bag Information

The following information on paper for multiwall paper bags, which are used very extensively in the chemical industry, was recently published by Chase Bag Company and is of particular interest to users of multiwall paper bags in the chemical industry.

In spite of the largest production in 1946 of all types of paper in U. S. history, there is still a definite shortage of some varieties. This is more pronounced by the increased use of multiwall paper bags. Prior to the war this type of bag was the generally accepted container for shipping building materials. With the current construction program, bag manufacturers find it difficult to obtain sufficient trims and basis weights to meet increased demands from the rock products industry. Mechanical methods of packing multiwall fertilizer bags have done much to popularize their use. These factors combine to make the converters' supply problem more difficult than ever.

Several articles have been written regarding the development of the protective merit of "wet-strength" paper. This specially treated sheet is not used as a moisture barrier, but is so composed that it retains a high degree of its original strength characteristics even though completely soaked in water for several hours. Ordinary paper disintegrates within a very short time when subject to wet conditions.

Wet-strength paper proved its worth during the war when technical experts included it in government specifications for multiwall paper bags. These bags were designed for overslipping cotton bags filled with subsistence for the armed forces. The construction of the overslip included two natural kraft sheets, two asphalt laminated walls for moisture resistance, and an outer wall of wet-strength paper. This over-all composition met very satisfactorily the rigorous handling and storage extremes necessitated by war conditions.

Due to the emergency requirements, synthetic resins and plastics came into general use in a much wider field during the war. At present the cost of incorporating these materials into kraft paper for ordinary purposes is prohibitively expensive. However, under conditions where extreme resistance to grease, oils, water, water vapor and chemical reaction is required, this added cost may be justified. Because of the relative ease and reduced cost of filling, handling and storing multiwall bags, compared to drums, kegs and boxes, protective paper composed of these materials may further the extended use of paper shipping sacks.

★ THE NEW MODEL JN ★

4-station automatic { VOLUME FILLER / VOLUME PACKER / GROSS WEIGHER

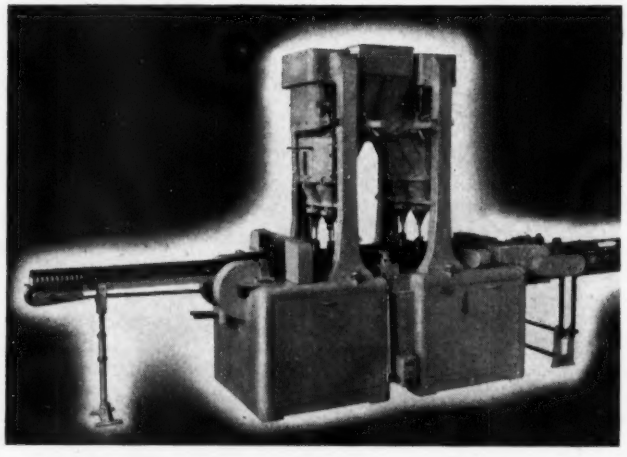
FOR ALL TYPES OF
POWDERED AND GRANULAR MATERIAL

The new model JN is a *fully automatic* filling machine that packs, or packs and weighs automatically. It can be adapted easily to handle jars, bottles, cans, cartons or other rigid containers.

With many added automatic features (such as vacuum dust collecting system) plus speed and accuracy, *the new JN* will soon pay for itself through savings in labor costs alone.

A manufacturer of dental powder reports that the model JN in his plant fills and packs 120 containers per minute—accurate to within ⅛ ounce.

It will pay you to investigate the many dollar-saving features of the JN. Write *U.S.* today for complete information.



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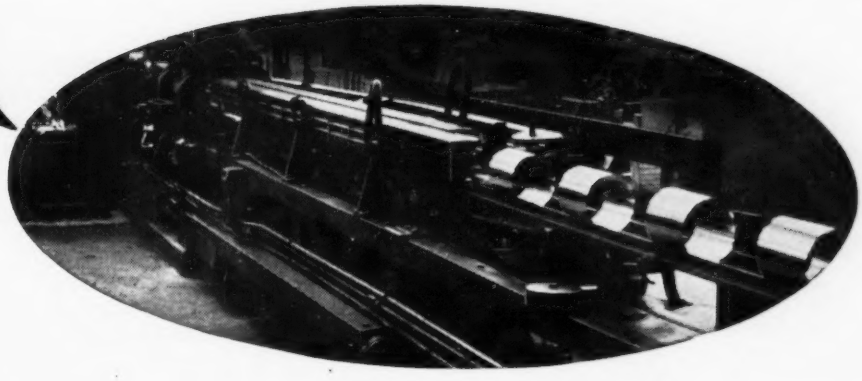


PLANT OPERATIONS NOTEBOOOK

As long as the supply lasts readers may obtain copies of "A. S. M E. Standard Automatic Control Terminology", reprinted from the last few issues of Chemical Industries.

Mobile Capacitor Unit Permits Emergency Electrical Power Supply Step-Up

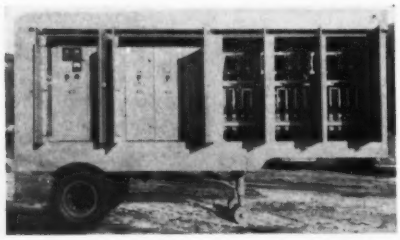
THE mobile capacitor unit built by the General Electric Co. for the Consolidated Gas, Electric Light and Power Co. of Baltimore was quickly given an assignment. A customer who purchased part of his power requirements from the company sustained the loss of a 250 hp steam engine. By use of this new unit the company was enabled to step up its supply of power to him for the three months which were estimated to be required to complete the necessary repairs. No further wiring, other than that required for the connections was needed.

The new 4150 volt capacitor, designed to supply such local emergency demands and for the full-scale testing of feeder lines to determine correct capacitor needs, consists of six 180 kvar (reactive kva) banks of Pyranol* capacitors mounted on a semi-trailer chassis.

Three of the banks are connected for automatic control and three for manual, the former being protected from short circuits by built-in, magne-blast circuit breakers. The capacitor equipment is connected to the main power lines by cables carried on reels in the rear compartment, which also houses the tools required for installation and operation. These cables equipped with hot line clamps, permit connections to be made without interruption of service.

* Reg. U. S. Patent Office.

General view of the unit ready to be moved.



The trailer, set up and ready to be connected. The side doors are open, showing equipment.

In addition to the obvious emergency uses, such as correcting overloads of the type noted in the first paragraph, the mobile unit can be used in carrying short seasonal peak loads without the necessity of installation of any additional wiring.

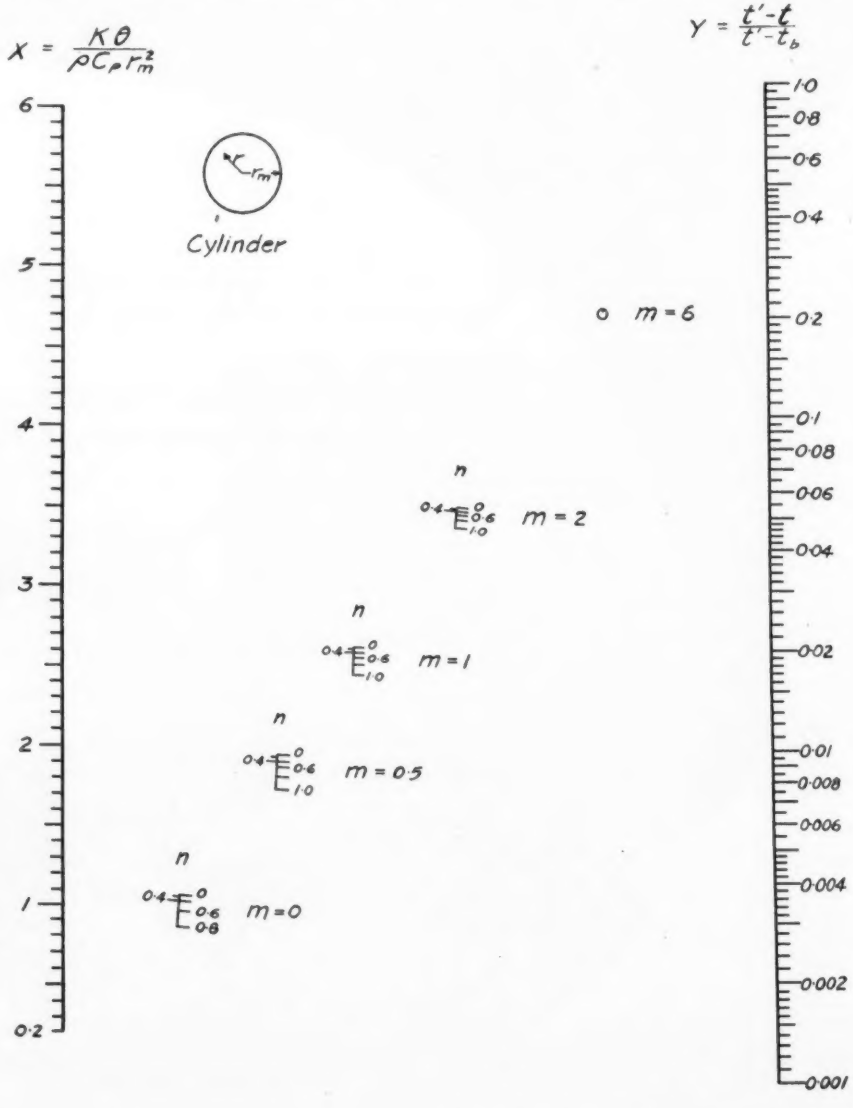
NOMOGRAPH-OF-THE-MONTH Edited by DALE S. DAVIS

Nomographs for Heat Transmission by Conduction in the Unsteady State

by D. S. DAVIS
Government Labs., Univ. of Akron, Akron, Ohio

Chemical Industries will be happy to receive any charts that you may have developed so that they may be shared with your fellow engineers. The authors of each chart used will receive an honorarium of $10.

WHEN, by conduction, a solid receives heat from or imparts heat to surroundings that are maintained at a constant temperature, an unsteady state



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PULMOTEK-L. for light duty. Standard aprons, 29″ x 40″; Weight 4 oz.; Sleeves, 18″ long.

PULMOTEK-M. for general use. Standard aprons, 33″ x 40″; Weight 6¾ oz.; Sleeves, 18″ long.

PULMOTEK-H. for heavy duty. Standard aprons, 33″ x 40″; Weight 14 oz.; Sleeves, 18″ long.

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is said to exist. The temperatures of points within the solid depend upon their positions and vary with the time that has elapsed since the heat began to flow. In general, the relationships in question are quite complicated but simplification has been effected[2] for slabs, cylinders, and spheres through the use of curves plotted in terms of four dimensionless groups. These are

$$X = \frac{k\,\theta}{\rho\, C_p\, r_m^2}, \text{ a relative time ratio}$$

$$Y = \frac{t' - t}{t' - t_b}, \text{ a temperature difference ratio}$$

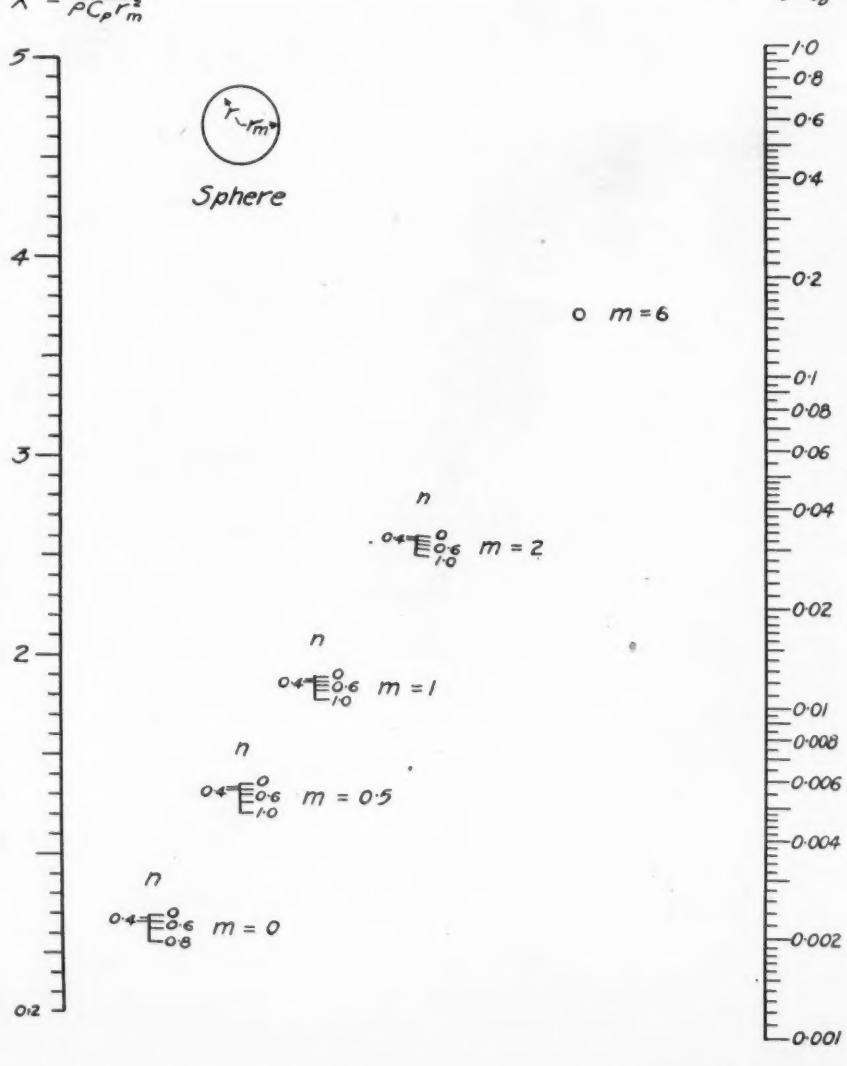
$$m = \frac{k}{h_T\, r_m}, \text{ a thermal resistance ratio}$$

$$n = \frac{r}{r_m}, \text{ a position ratio.}$$

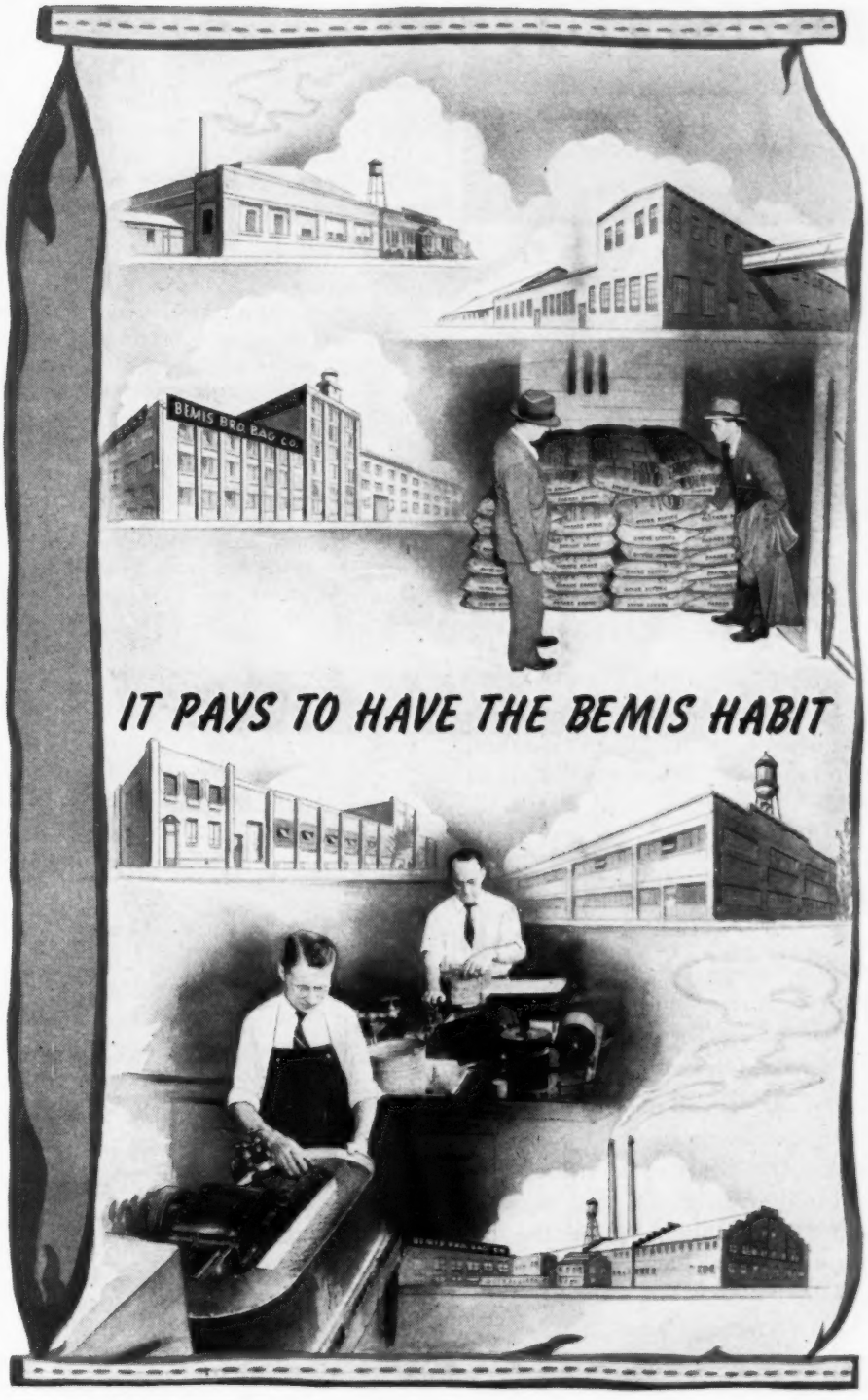
The following familiar nomenclature and consistent units are suggested for use in these groups:

k = thermal conductivity of the solid, B.t.u./(hr.) (sq. ft.) (°F. per ft.)
ρ = density of the solid, pounds per cubic foot
C_p = specific heat of the solid, B.t.u./(lb.) (°F.)
t_b and t = initial and final temperatures of body, respectively
t' = temperature of surroundings
θ = time, hours
h_T = coefficient of total heat transfer between the surroundings and the surface of the solid, B.t.u./(hr.) (sq. ft. of surface) (°F.)
r = distance from the mid-point or mid-plane to the point in question, feet
r_m = radius of the cylinder or sphere or one-half of the thickness of the slab if it is heated from both sides or the total thickness of the slab if it is heated (or cooled) from one side only and insulated perfectly at the other, feet.

The accompanying charts, constructed by methods previously described,[1] present the Gurney and Lurie data[2] for cylinders, spheres, and slabs in nomographic form. The use of the alignment charts is illustrated as follows: How long will it take to bring the temperature at the axis of a boro-silicate glass cylinder 2 inches in diameter and initially at 90° F. to 160° F. by means of heat conducted from a closely fitting steel form maintained at



If we could package Bemis Multiwall Service—the brand might look something like this



Bemis' 6 strategically located Multiwall Plants enable us to give quick service to all parts of the country . . . to meet peak-season demands. Bemis Packaging Specialists help work out your packaging problems right in your own plant. Often they can improve packing line operations, speed up production, and lower costs. You get all this neatly wrapped up in one complete money-saving package when you choose Bemis Multiwall Paper Shipping Sacks.

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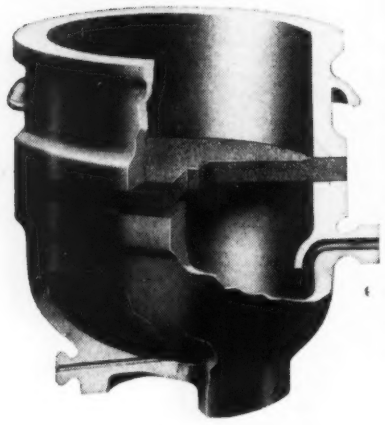
CHEMICAL STONEWARE

SUCTION FILTERS



Speed up filtering by as much as 400% with "U. S." Suction Filters and "Filterstone" Porous Plates.

Fast, clear filtration of essential oils, drugs, extracts, lotions, medicines, dyes, perfumes, etc., is assured with "U. S." Chemical Stoneware suction filters and "Filterstone" Porous Plates. "Filterstone" plates may be used alone or in conjunction with other filter media.

Fig. 709 (shown above) is a 3-piece filter with separate upper and lower parts. Other styles include one-piece filters with integral support plate, gravity filters, bag filters, and pressure filters. Capacities 5 to 100 gallons.

●

Write for the "U. S." chemical stoneware catalog showing hundreds of standard and special items, such as, tanks, pots, crocks, valves, pipe, fittings, tourills, acid eggs, kjehdal equipment, pumps, coils, etc.

PROCESS EQUIPMENT DIVISION

U. S. STONEWARE

Akron 9, Ohio

170° F. if 1100 can be taken as a satisfactory value for h_T? Substitution of $t' = 170$, $t = 160$, and $t_b = 90$ in the temperature difference ratio yields $Y = 0.125$. The radius of the cylinder is 1/12 foot and the thermal conductivity of borosilicate glass is 0.63.[3] These data enable calculation of the thermal resistance ratio

$$m = \frac{k}{h_T\ r_m} = \frac{0.63\ (12)}{1100\ (1)} = 0.0069$$

which is near enough to zero so that the set of points marked $m = 0$ can be used. At the center of the cylinder the value of r is zero, which requires n, also, to be zero. Use the nomograph for cylinders, connect 0.125 on the Y axis with the point where $n = 0$ in the group where $m = 0$, and note that the intersection with the X scale is at 0.44. Substitution of $k = 0.63$, $X = 0.44$, $\rho = 139$,[3] $C_p = 0.196$,[4] and $r_m = 1/12$ in the equation for the relative time ratio yields, the value, $\theta = 0.132$ hour.

What is the temperature at a point 0.6 inch from the axis of the cylinder? At this point the position ratio is 0.6. Connect $n = 0.6$ in the set of points marked $m = 0$ with $X = 0.44$ and read the intersection with the Y axis as 0.07. From the equation

$$Y = 0.07 = \frac{170 - t}{170 - 90}$$

the desired temperature is found to be 164.4° F.

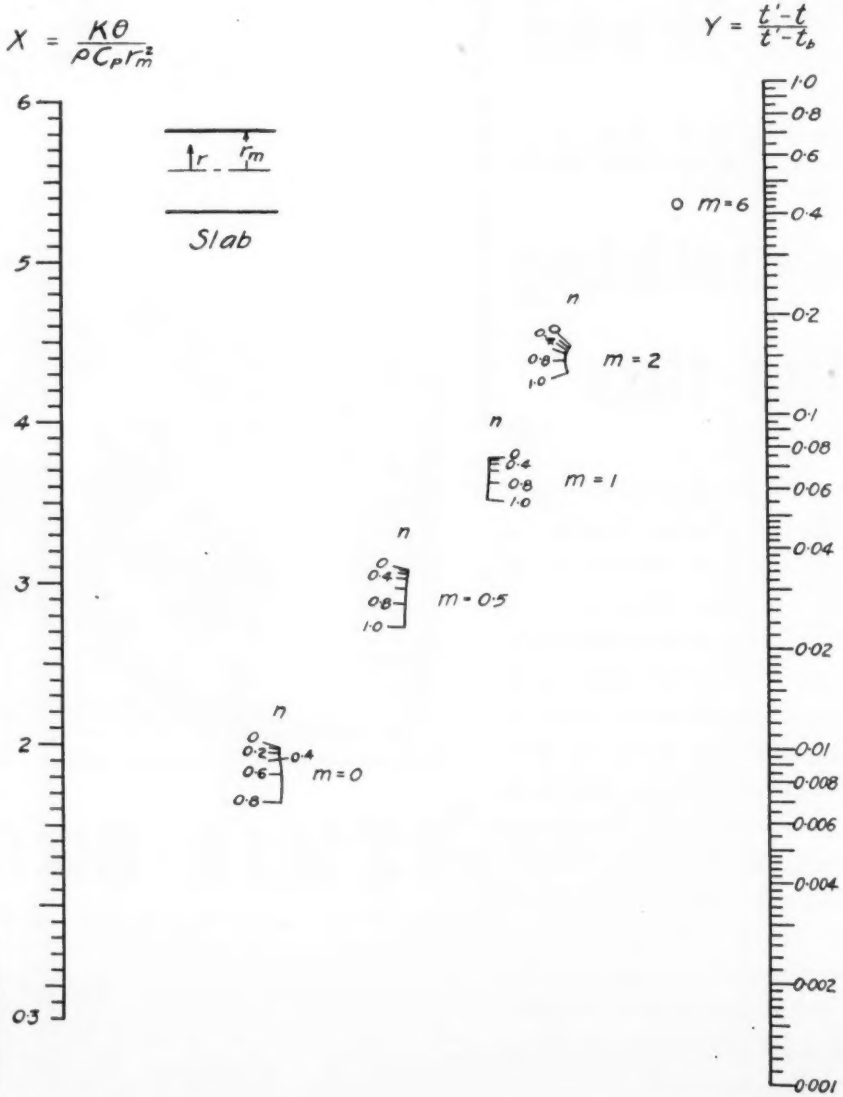
Literature Cited

[1] Davis, D. S., "Empirical Equations and Nomography," Chap. IX, New York, McGraw-Hill Book Co., 1943.
[2] Gurney, H. P., and Lurie, J., Ind. Eng. Chem., **15**, 1170 (1923).
[3] Perry, J. H., "Chemical Engineers' Handbook," 2nd ed., p. 952, New York, McGraw-Hill Book Co. 1941.
[4] Ibid., p. 543

Graphite to Dissipate Static Electricity

Drive belts, conveyors containing flammable materials, journal bearings on trucks or similar equipment often collect hazardous charges of static electricity. Many plants have found it possible to dissipate these charges by bleeding off the static charge with coatings of colloidal graphite.

This conducting coating, to be effective on drive or other belts, must be used with grounded metal pulleys. A coating on one side is sufficient for drive belts but it is often desirable to coat both sides of conveyor belts.



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With the addition of propionaldehyde to the group of organic chemicals produced at Bishop, Texas, Celanese now offers industry a family of lower aldehydes which includes formaldehyde and acetaldehyde as well as this hitherto commercially unavailable three-carbon aldehyde. Sample quantities of propionaldehyde are available immediately for experimentation and pilot plant development. As propionaldehyde is incorporated into industrial processes, large scale production will be gauged to demand.

There are advantages in making Celanese your source of supply for organic chemicals. Situated in an area rich in natural gas, the basic material for Celanese chemicals, Celanese offers stability of supply with all its attendant benefits. Our Celanese Technical Staff is prepared to work with you to suggest the opportunities and processing improvements presented by this new group of petroleum chemicals now available from Celanese. Celanese Chemical Corporation, division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

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PLASTICIZERS
INTERMEDIATES

Celanese Chemicals*

LABORATORY NOTEBOOK

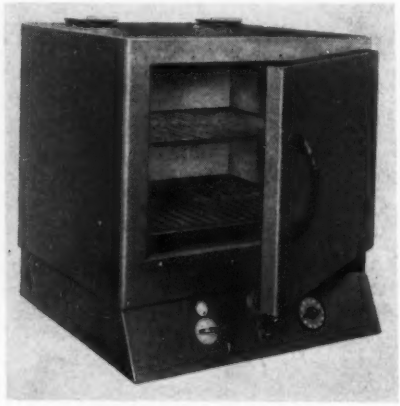
Rapid Method of Ore Analysis

A spectro-chemical method employing the so-called "total energy" theory is being used to determine the distribution of germanium, tin and lead in ore samples at the Bureau of Mines. Accuracy compares favorably with that achieved by chemical methods and the time saved is considerable. The spectrograph permits determining simultaneously the concentrations of several elements.

When perfected the method will be generally applicable to all ores. It is described in Report of Investigations 3965, "A Method for the Spectrochemical Determination of Germanium, Tin, and Lead in Ore Samples," and may be obtained free from the Bureau of Mines, Department of the Interior, Washington 25, D. C.

Laboratory Oven Equalizes Interior Heat

Designed for chemical laboratories doing precipitation, steel drawings, ash content and other similar general chemical work is a new laboratory oven which equalizes interior heat by a simple double venting device. It features thermostatically controlled temperatures from 0° to 550° F. with an added timing device which maintains desired temperatures for various periods of time as required.

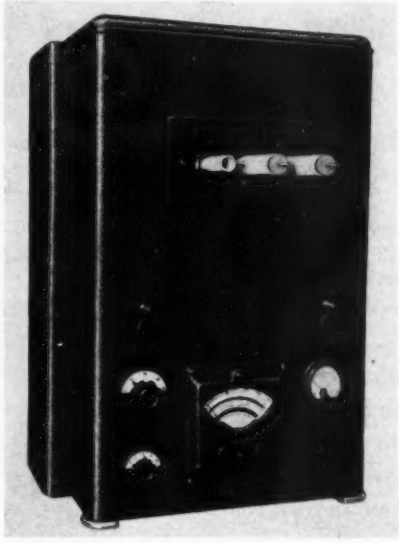


Even distribution of heat is accomplished by two large vents located on either side of the top of the oven. These vents serve also to remove unwanted fumes and gases. A third, smaller vent permits entrance of a thermometer into the heat chamber. Interior of the oven, in the standard Model 5700, is lined with steel and a baked aluminum surface. For special uses, a stainless steel work chamber is available. Interior dimensions are 20" x 15" x 19".

Door latches are explosion-proof. Standard equipment includes two expanded metal trays, a built-in pilot light indicating "on" and "off." The oven is available from The K. H. Huppert Company, 6830 Cottage Grove Avenue, Chicago, Illinois.

Combustion Furnace

A new high temperature laboratory combustion furnace with a maximum high operating range of 2900° F. is being marketed under the trademark Hitemp Furnace by the Harry W. Dietert Co. This



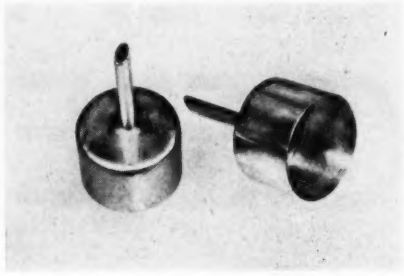
furnace may be used as a single, double, or triple tube unit.

It comes as an integral unit, ready to plug into the 220-volt outlet, equipped complete with power supply, ammeter, rotary power selection switches, heating elements, automatic temperature control and thermocouple. A combination disconnect switch and circuit breaker is provided which automatically protects the furnace against overloads. An electronic automatic temperature controller is furnished.

Six ¾-inch diameter heating elements are used which provide a radiating surface area of 128 square inches. The outer layer of insulating material is 1½ inches thick Superx Block, and the total furnace wall thickness is 6¼ inches.

Stainless Steel Lab Filters

Stainless steel laboratory filters, Buchner funnels, gas dispersion tubes, filter tubes and filter crucibles are now available from the Micro Metallic Corp. These filters are made up of a porous stainless steel filter element welded into a solid stainless steel body. In addition to freedom from breakage, the filters can be heated and cooled without danger of cracking. They are light and uniform in weight. Higher flow rates for given pore size are said to be obtained than with other types of filters. They may be used with or without filter paper. The filters



are available in five porosities ranging from very fine to very coarse. The Buchner funnels are illustrated.

Analysis of Hydrocarbons by Adsorption Fractionation

A new laboratory instrument, the Turner-Burrell adsorption fractionator provides a means of separating, identifying, measuring and collecting the components of light hydrocarbon gas mixtures and recording the analytical data. The analysis is graphically presented in curve form.

The operating technique is simple and unskilled personnel may be trained to follow standardized procedures. The equipment will follow a pre-selected program permitting the operator to be absent from the laboratory during the major portion of the analysis.

The apparatus is a self-contained unit 78 inches high, 42 inches wide and 21 inches deep, weighing 500 pounds. There are no accessory assemblies and no refrigerants are required. Turner-Burrell Adsorption Fractionator Bulletin 205 is available from the Burrell Technical Supply Co., 1942 Fifth Avenue, Pittsburgh, Pa.

Cutter For Glass Tubing

A new cutter with steel wheel is designed for use on glass tubing or rod, and porcelain or silica tubing. The entire apparatus is enclosed, the cutting wheel being protected by a guard.

The instrument is equipped with a 5-inch wheel; a crystalon wheel 1/16-inch thick is also provided for use on silica or porcelain tubing. Wheel speed is 3400 r.p.m. through a V-belt drive; oil-lite bronze bearings insure long life. Overall dimensions are 9 inches high by 10½ inches wide by 16 inches long. Off-on toggle switch mounted on front of the case controls operation on 110 volts, 60 cycle A. C.

WHAT ISCO RESEARCH AND SERVICE MEAN TO YOU

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ISCO products make better living possible. Such everyday items as pencil leads, plastics, textiles, linoleum, cigars and cigarettes, and even jelly beans are better because of some ISCO chemical, gum or wax. ISCO research has made possible better carbon paper, better shoe polish, better paints and varnishes—better products in all walks of life. In more than five generations Innis Speiden has provided industry with hundreds of different raw materials to make industry's service to mankind an easier task.

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Yes, you use an ISCO product almost every time you buy. In the food you eat—in plastics, linoleum, paints, polishes, in almost everything—there's an ISCO chemical, gum or wax. Among the ISCO products for making finer cosmetics are absorption bases, boric acid, china clay, cream bases, gums, magnesium carbonate, talc, waxes, borax, potash, soda, lanolin, stearates, wetting agents and some really remarkable surface active agents.

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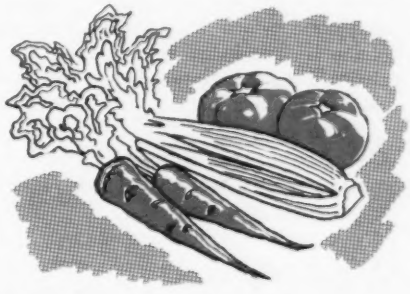
ISCO products are widely used in the food industry to help produce better, tastier, cleaner, more attractive foods. Grapefruit, apples, potatoes are polished with ISCO waxes. ISCO gums are used in huge quantities in cheeses, dairy products, salad dressings and sauces. ISCO carnauba wax helps make better jelly beans, chocolate coated nuts and similar goodies.



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Inorganic Preparations

INORGANIC SYNTHESES, VOLUME II, *editor-in-chief, W. Conard Fernelius.* McGraw-Hill Book Co., Inc., New York, 1946. 293 pp., price, $4.00. Reviewed by Thomas R. P. Gibb, Jr., Metal Hydrides, Inc.

THIS VOLUME carries on the commendable policies and practices adopted for Volume I and is equally indispensable to the practicing chemist.

Syntheses of approximately one hundred inorganic substances are described clearly and in quantitative detail with sketches of any special equipment required. The treatment accorded each topic varies in length and detail according to the complexity of the operations involved, although the style is remarkably consistent. The topics vary in scope from a few paragraphs on the preparation of sugar charcoal by heating to a total of forty-five pages on the extraction, separation and properties of the rare earth salts.

The organic chemist will find much of value in this volume, for the preparation of a number of often-used reagents is described, e.g. sodium amide, phosphorous halides, chromia catalyst, nitrosyl chloride, cyanogen chloride. The preparation of a number of acetylacetonates and related compounds is given.

Metal carbonyls are discussed very concisely as a group, and detailed directions are given for the preparation of six representative compounds. The number and diversity of the individual syntheses given precludes reference to all of them. (A brief summary of each, however, is given in *Chemical Abstracts* **40**, 7025).

The eleven-page section on nomenclature of inorganic compounds is a most valuable contribution which is not duplicated in Volume I. The index is cumulative and includes both conventional and revised names. A formula index is also given covering both volumes.

Contributors, editors, and publisher have all set a high standard for subsequent volumes in the series.

FDA Legislation

NEW DRUGS, *by Arthur D. Herrick, with a foreword by Dr. Austin E. Smith.* Revere Publishing Company, New York 4, N. Y. 1946; 319 pp. $4.00. Reviewed by Aaron Addelston, Winthrop Chemical Co. Inc.

THE AUTHOR covers in 153 pages all of the regulations, interpretations and administrative practices of the Food and Drug Administration pertaining to Section 505, commonly termed the "New Drug" section, of the Federal Food Drug and Cosmetic Act of 1938. He explains concisely, but without omitting any essential details, what makes a product a new drug, how new drug applications are filed, what information they must contain, the types of action the FDA may take upon such applications and the methods of appeal at the disposal of the manufacturer.

The chief value of the book lies in the fact that it departs from official legal language and emphasizes instead the practical significance of the legal terminology.

Manufacturers of new drugs would do well to heed the author's caution regarding the many changes in administrative procedures which have developed during the war years. Of particular interest to manufacturers of bulk chemicals is the information given on page 28 ff. regarding the labeling and legal status of new drugs which are shipped for manufacturing use and not in finished pharmaceutical form. Also of considerable interest is the detailed description of the tests and evidence which should be submitted to prove their safety.

The author points out that ordinarily each manufacturer or distributor of a new drug must file his own application. As an exception to this rule he states on page 11 and again on page 77 that new drug applications are not required for a sulfonamide preparation whose label limits its use by and under the supervision of a physician; this statement should be interpreted as applying only to such sulfonamide drugs as have already been introduced to interstate commerce, viz., sulfanilamide, sulfapyridine, sulfathiazole, sulfadiazine, sulfaguanadine, etc., but would not apply to a new derivative in this field such as sulfaquinoline or sulfaacridine.

This book should prove a useful addition to the references consulted by every drug executive concerned with the introduction of new drugs.

Other Publications

INVENTION, INC., patent research organization, has issued a SUMMARY OF SERVICES (obtainable free) defining and describing over 30 different methods and variations of obtaining technical information from patents. Charges vary according to method subscribed to. Munsey Bldg., Washington 4, D. C.

ACETANILID: A CRITICAL BIBLIOGRAPHIC REVIEW, by Martin Gross, M. D., is a monograph reviewing the 750 and more papers that have appeared on acetanilid in the last 60 years. Hillhouse Press, New Haven, Conn., price, $3.

ANILINE, Series 5 of CONTROLLING CHEMICAL HAZARDS, describes preventive methods of controlling toxicity of the material. Supt. of Documents, G. P. O., Washington 25, D. C. Five cents per copy, with 25 per cent discount on orders of 100 or more.

PHILIPS TECHNICAL REVIEW, discontinued during the war, has resumed monthly publication. Handled in this conntry by Elsevier Publ. Co., Inc., 215 4th Ave., N. Y., the annual subscription is $5.

ACCOUNTING MANUAL for use of firms in the plastics industry has been published by the Society of the Plastics Industry, Inc., 295 Madison Ave., New York 17, N. Y. Price to members, $2.50, to others, $5. The Society has also issued the sixth chapter of its TECHNICAL HANDBOOK. It is entitled "Design of Molded Articles" and is available for $1 (less in larger quantities). All of the individual chapters will be published as a book eventually.

ANALYSIS AND DESIGN OF TRANSLATOR CHAINS is a two-volume book on basic design problems, an attempt to rationalize the design and analysis of mechanical devices, the philosophy behind which offers a new tool to engineers who have to deal with much equipment. It is published by Askania Regulator Co., 1603 S. Michigan Ave., Chicago, Ill., and is available from the company at $5.

BUREAU OF MINES has announced that it has completed three SOUND FILMS in 1946 and has 12 more in various stages of production. These, along with others previously made, are available without charge (except transportation costs and damages) to interested groups. Subjects of new films include Texas, Oklahoma, Ohio, California, steel, nickel, copper, storage batteries, aluminum, gasoline and lubricating oil. Application should be made to the Bureau's Central Experiment Station, 4800 Forbes St., Pittsburgh, Pa.

THE PHARMACEUTICAL INDUSTRY, by Robert A. Hardt, is one of a series of occupational booklets describing job opportunities and requirements in American industries. A special feature is the analytical index of occupations. The booklet is available at $1 from Bellman Publ. Co., Inc., 83 Newbury St., Boston 16, Mass.

SYNTHETIC ORGANIC CHEMICALS (United States production and sales, 1944) is now available from the Supt. of Documents, G. P. O., Washington 25, D. C., for 25c. It is Report No. 155, Series 2, of the U. S. Tariff Commission, giving official statistics as well as names of manufacturers of most of the synthetic organic chemicals produced on a commercial scale.

PENTAERYTHRITOL USES is a 440-page bibliography consisting of lengthy summaries of 354 patents and articles referring to uses of pentaerythritol together with editorial comment. It represents a complete literature search. It was prepared by Burrell and Neidig, industrial chemical consultants, 115 Broadway, New York 6, N. Y., and is available from them at $15 per copy.

NITRIC ACID is the subject of Chemical Safety Data Sheet SD-5, available at 30c per copy from the Manufacturing Chemists' Association, 608 Woodward Bldg., Washington 5, D. C. Designed for supervisory staffs and management, it sets forth concisely the essential information for safe handling and use of the material.

NURSING IN COMMERCE AND INDUSTRY, by Bethel J. McGrath, R. N., will be of interest to doctors and nurses employed by the chemical industry. Published by the Commonwealth Fund, 41 E. 57th St., New York 22, N. Y., the price is $3.

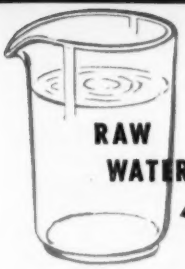
A list of MANUFACTURING DIRECTORIES published for each of the United States and Alaska is available from the Business Information Bureau of the Cleveland Public Library, Cleveland, Ohio, for 10 cents in stamps or money.

ALUMINUM ALLOYS AND MILL PRODUCTS is the subject of a 248 page book available from the Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky., at $2.00. Color-indexed, the book contains a cross index and separate listings of its 106 tables. It briefly covers the history of aluminum, discusses alloy tempers and physical properties, and presents data on chemical, physical, and mechanical properties of high purity aluminum. Much information for the manufacturer is contained in the chapters on mill products.

Free upon request is "Technical Advisor," a new monthly technical paper designed to give those of the metalworking industries suggestions on effective use of aluminum mill products. Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky.

FAXFILM FAX, a single-page bulletin, describes the applications of Faxfilm in the study of surface condition. Persons desiring future issues should send their requests on company letterheads to Faxfilm Company, Room 519, 1220 W. Sixth St., Cleveland 13, O.

THERMODYNAMIC PROPERTIES OF AMMONIUM AND POTASSIUM ALUMS AND RELATED SUBSTANCES, WITH REFERENCES TO EXTRACTION OF ALUMINA FROM CLAY AND ALUNITE, Technical Paper 688, recently issued by the Bureau of Mines, can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 20 cents.



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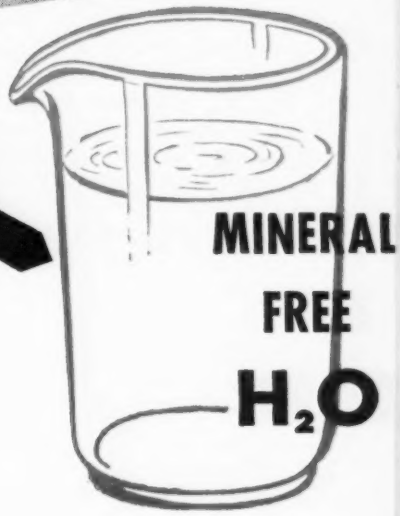

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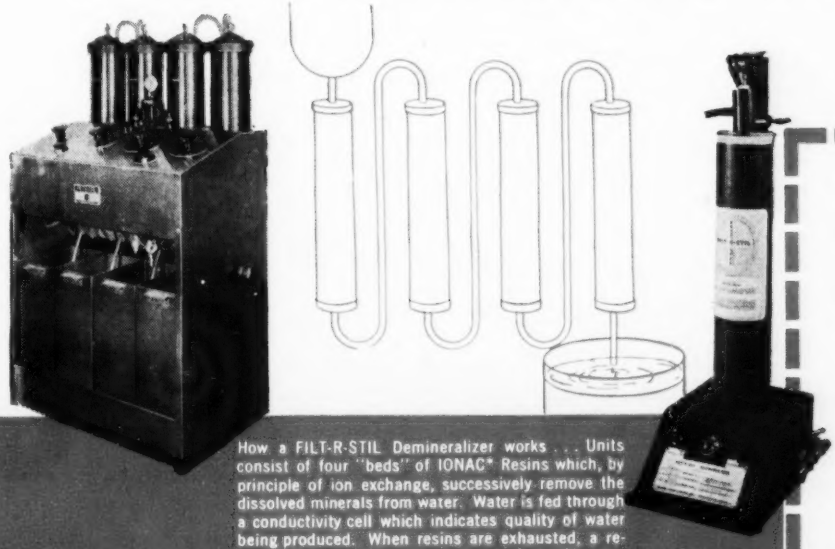

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B172. CHEMICALS. 4 charts giving the physical properties of the n-aliphatic acids, amines, amides, and nitriles, Armour Chem. Div.

B173. CHLORINE. "Organic Chlorine Compounds," 24 pp. (No. F-4769 P-18034), Carbide & Carbon Chem. Corp.

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B178. NITROGEN COMPOUNDS. "Organic Nitrogen Compounds," 31 pp. (F-4770-A P-19032), Carbide & Carbon Chem. Corp.

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B180. PHARMACEUTICALS. "APC Products Catalog," 94 pp., American Pharmaceutical Co., Inc.

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B188. SYNTHETIC RUBBER. Synthetic Rubber Data," Acadia Synthetic Prods. Div., Western Felt Works.

Equipment

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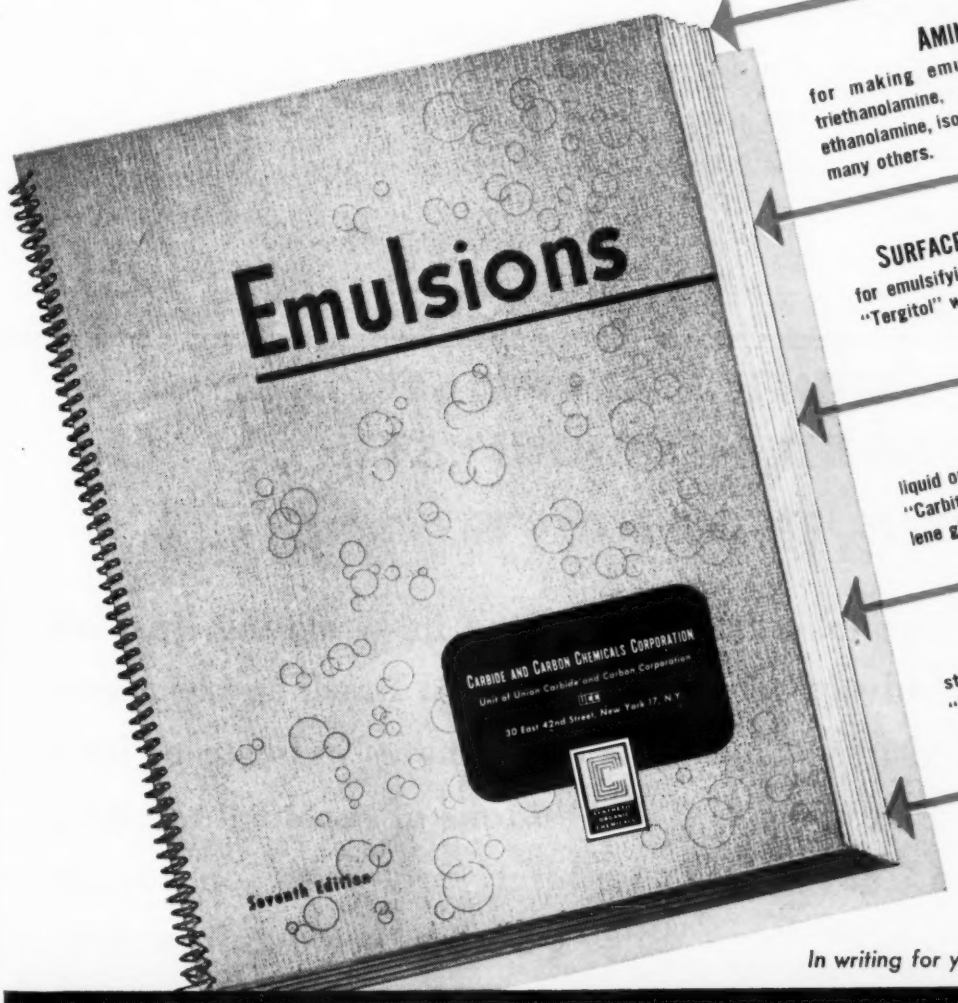
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129°C	1212 "
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Density (molten) @ 65°C	**1.170**
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Water	Readily Soluble
Alcohols	" "
Ketones	" "
Ethers	" "
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For technical assistance and copies of Bulletin F-300-1146, which gives more information about Trioxane, write or call our nearest District Office. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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NEWS OF THE MONTH

New Agency to Screen Compounds for Bio-Activity

A SYSTEMATIC evaluation of all chemical compounds for toxic and other biological properties is the tremendous undertaking being launched by the recently created Chemical-Biological Coordination Center in Washington, D. C.

Headed by Dr. W. R. Kirner, former N.D.R.C. member and professor of organic chemistry at Carnegie Institute of Technology, the Center's staff organization is now virtually complete. The first samples of new compounds have been received and are starting their journey through the intricate screening process that has been set up with the help of an advisory committee of 14 distinguished scientists.

Actually the objective of the Center is twofold: (1) to collect and assemble information which it is hoped will establish certain definite relationships between chemical structure and biological activity of compounds, and (2) to sponsor preliminary screening of new compounds for biological properties which will indicate possible usefulness in such capacities as insecticides, fungicides, rodenticides, therapeutic agents, or national defense materials.

The Center has been almost a year in the making. The idea first began to take definite shape last July. In 1944 Vannevar Bush suggested that there should be a committee to coordinate the valuable work on insect and rodent control that was being done by the Office of Scientific Research and Development. The following year the N. R. C. decided to continue such work after OSRD, a war agency, was dissolved. Dr. M. C. Winternitz of the Yale medical school was chairman of the OSRD Insect and Rodent Control committee and later of the similar committee of the National Research Council, of which Dr. Bronk is head.

Dr. Winternitz is now chairman of the Center's advisory committee, which includes Dr. Roger Adams as its member on organic chemistry, Dr. W. A. Noyes on physical chemistry, Dr. J. S. Fruton on biochemistry, as well as eleven other distinguished medical and biological scientists.

The Center has a budget of $100,000 for its first year. The funds are being provided by the War Department, Navy Department, and American Cancer Society. The National Academy of Sciences has provided office space in its building on Constitution Ave. for the organization's permanent staff, which in addition to Dr. Kirner includes nine technical aides plus about an equal number of clerical assistants.

As the various compounds are tested, it is the Center's plan to tabulate and file the results under an elaborate cross-indexing system which involves the use of codes and punch-card techniques. All data will be available to scientists generally.

The Center does not actually conduct the tests itself, but has made special arrangements to have this work done by

Walter R. Kirner, head of the new Center.

cooperating laboratories which include the Army and Navy Technical Service Laboratories, Fish and Wildlife Service, Bureau of Entomology and Plant Quarantine, Chemical Corps, Sloan-Kettering Institute for Cancer Research, and the National Cancer Institute.

The Center is at present desirous of receiving samples of both old and new organic compounds—from private as well as institutional laboratories—for purposes of screening. Lists of compounds which can be provided should be sent to the Chemical-Biological Coordination Center, National Research Council, 2101 Constitution Ave., Washington 25, D. C. All available information concerning the sample should be included. Forms on which to submit data are available on request. Samples of 25 grams are desired, smaller samples will be accepted and tested to the limit of the material available.

The importance of providing complete data, to expedite screening, is stressed by Dr. Kirner. The information should include: chemical name; structure; analysis; likely impurities; physical properties, including stability and solubility, and any known biological properties.

All screening data on individual compounds will be reported to the person submitting the sample so that he can further investigate any fields of promise.

QMC Seeks Specification Suggestions

Suggestions from industry are being sought by the Quartermaster Corps in the revision of testing procedures described in specifications for Quartermaster items.

As a part of its peacetime scientific research program, the Research and Development Branch, Military Planning Division, of the OQMG will review the directions for, and methods of testing, as contained in its numerous specifications with a view to bringing them in line with the latest developments in scientific and industrial fields.

The Research and Development Branch is now asking that scientists, technicians, and persons connected with industry submit their opinions, criticisms, and suggestions in regard to test paragraphs in QMC specifications.

Letters and material should be addressed to: The Quartermaster General, Attention: Specifications Section, Research and Development Branch, Military Planning Division, Washington 25.

A. I. Ch. E. Regional Meeting Hears Science Proposal

Still another proposal on the much discussed subject of national science legislation was heard by members of the American Institute of Chemical Engineers who attended the regional meeting of that organization in Louisville last month. H. Fred Willkie, vice-president and director of Joseph E. Seagram and Sons, Inc., advocated that a position of Secretary of Research be created in the president's cabinet.

Mr. Willkie, who is a brother of the late Wendell Willkie, suggested that it should be the function of such a secretary to establish a National Research Foundation. This should have three broad functions: (1) correlation of research done currently through universities, private foundations, government agencies and individual efforts; (2) performance or delegation of original research to be per-

formed in fields not covered by independent agencies and where the national interest seems to require it; and (3) dissemination of technical materials for universities and research workers on the one hand, and on the other, simplified materials for the average non-technical person, similar to those issued by the Department of Agriculture. He also suggested that the office of the Secretary of Research should serve as a clearing house for current research and should issue periodically an encyclopedia of problems in all fields which are worthy of investigation.

Among the eighteen technical papers presented at the meeting, several were of more than ordinary interest to the 500 engineers in attendance.

A unique process for the continuous isolation of GR-M, a polymer of 2-chloro-1,3-butadiene, from latex was described by M. A. Youker, of E. I. duPont de Nemours & Co. GR-M is obtained in short rope-like sections from latex by a process involving the continuous formation of a polymer film by coagulating latex on a freeze drum at about —10° C. The film is washed and then dried at 120° C. The process is said to be efficient and sufficiently flexible to permit the processing of different grades of GR-M.

A continuous process for blending concentrated soap stock with lube oil to make a high quality lubricating grease was described in a paper by H. G. Houlton, of the Girdler Corp., and A. E. Calkins and A. Beerbower, of Standard Oil Co. of N. J. The continuous blending is accomplished by use of a Votator. Savings over batch methods were claimed by the authors to be sufficient to amortize the plant in about a year's time.

Experimental reduction of clay or siliceous bauxite with coke in electric furnaces to produce aluminum-silicon alloys containing 25 to 70% Al, 25 to 70% Si, and small amounts of Fe and Ti was described by M. M. Striplin and W. M. Kelly, of the Tennessee Valley Authority. About 12,000 KWH of power, 0.8 ton of coke and 2.5 tons of calcined clay, containing 46% Al_2O_3 and 50% SiO_2, were used per ton of alloy. The authors regard the production of such Al-Si alloys as economically promising for use in steel making and as metallurgical reducing agents.

They also regard it as possible that the alloys may be used instead of silicon metal in aluminum casting alloy and as starting materials for the production of aluminum and silicon metals.

A process for the continuous hydrolysis of fatty oils to form fatty acids and aqueous glycerol was the subject of a paper by H. D. Allen and others, of the Colgate-Palmolive-Peet Co. Water and fatty oil are pumped countercurrent to each other in a vertical tower at 700 psi. and 485° F. to give 96 to 99% hydrolysis of the triglyceride esters to fatty acids plus aqueous glycerol of 10 to 25% concentration.

The committee on arrangements for the meeting was headed by R. C. Ernst, University of Louisville, as honorary chairman; R. M. Reed, The Girdler Corp., general chairman; J. R. Stuetz, Joseph E. Seagram & Sons, co-chairman; and G. C. Williams, University of Louisville, secretary-treasurer.

Swain Appointed Cyanamid Vice-president

Robert C. Swain, formerly research director of American Cyanamid Co., has been named vice-president in charge of research and development. He succeeds M. C. Whitaker, who has retired from active direction of research, but will continue in a consulting capacity.

Thioglycolic Patent Upheld

The first patent decision in connection with the use of mercaptans (e.g., thioglycolic acid and thioglycerol) in the beauty field has been handed down by Judge William C. Coleman of the District Court of the United States for the District of Maryland in the patent infringement suit tried in November, 1946.

Judge Coleman's decision holds that Patent No. 2,352,524, for a depilatory invented by Ralph L. Evans and Everett G. McDonough, and owned by Sales Affiliates, Inc., of New York City, is infringed by several depilatory products at present on the market.

The decision, which may have far reaching results in the cosmetic field, entitles the patent owners to injunction against further manufacture, sale or use of the infringing depilatories and refers the case to a special master to determine the amount of profit and damages to be awarded.

Because of the wide application, particularly of thioglycolic acid in perma-

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For better soaps, cosmetics, and leather finishing. A time tested softening and penetrating agent.

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THE MAYPONS
Unique organic detergents; highly desirable characteristics for textile processing, cosmetics, emulsions, and industrial and household cleaning. They give prolific foam, have high wetting, cleansing, and emulsifying properties, and are effective in pH ranges from 5 up.

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Chlorophyll, carotene, and other brilliant, non-toxic pigments for mouth washes, cosmetics, perfumes, leather, candles, foods, etc. Chlorophyll makes an excellent air purifier, reacting with and killing unpleasant odors.

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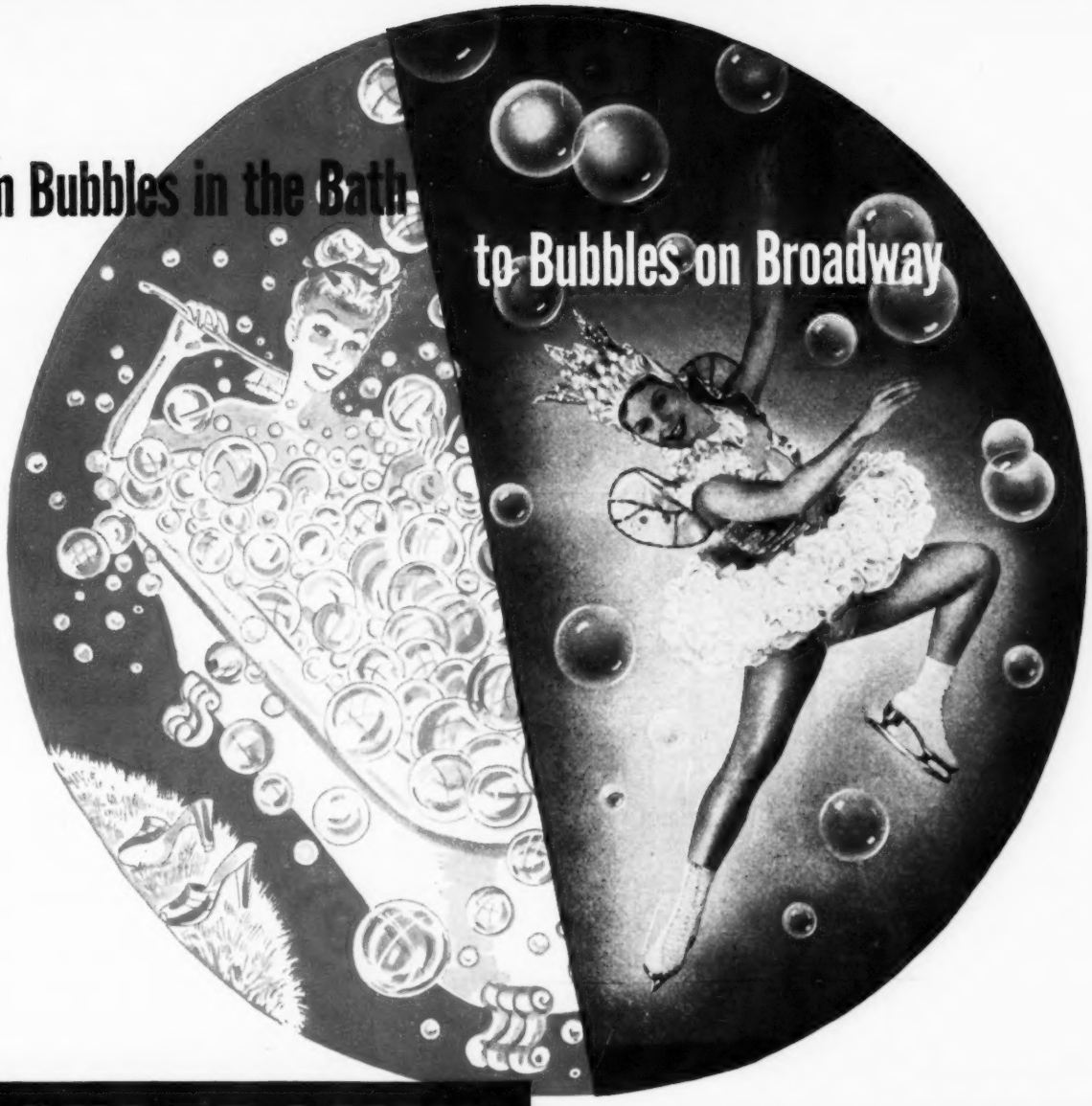

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Because of its unique properties, Sulframin is first choice as a foaming agent and detergent...specified by manufacturers of bubble bath preparations, dyeing assistants, tanning specialties, laundry detergents and general cleansers.

Even Douglas Leigh chose Sulframin DT..one of the outstanding products of the Sulframin series...for a dazzling bubble scene in the ICECAPADES of '46 and for one of his Broadway 'spectacular' signs, because comparative testing showed that only Sulframin DT permitted the giant-size, stronger, longer-lasting bubbles needed.

Though all its applications are not so spectacular, Sulframin's fine performance is consistent at all times.

Highly concentrated, Sulframin is effective even in dilutions of 1 to 10,000. It is immediately soluble in hot or cold water, highly resistant to hard water and to the chemical action of lime, magnesium salts, acids and alkalis. It combines readily with trisodium phosphate and similar cleanser ingredients.

Sulframin is available in liquid, paste and powder form—to fit your particular requirements. In any form, it has maximum effectiveness.

To learn complete details about the Sulframin Series of Detergents and their application to your needs, write us today. An Ultra technician will be glad to discuss your formulary problems with you.

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nent waving, this decision may pave the way for development of a similar patent situation in the field of permanent hair waving.

Reports Issued by OTS

Reports recently released by the Office of Technical Services, U. S. Department of Commerce include:

THE PORCELAIN ENAMEL AND CERAMIC COLOR INDUSTRY IN GERMANY; (PB-40316) photostat $5; microfilm, $2; 74 pages.

SELECTION AND APPLICATION OF MOLD AND CORE BLACKWASHES (PB-40348): photostat, $1; microfilm, $1; 15 pages, including tables and one drawing.

GERMAN PRODUCTION OF SOME OF THE MORE IMPORTANT INORGANIC PIGMENTS (PB-40350); microfilm $2; photostat $6; 82 pages.

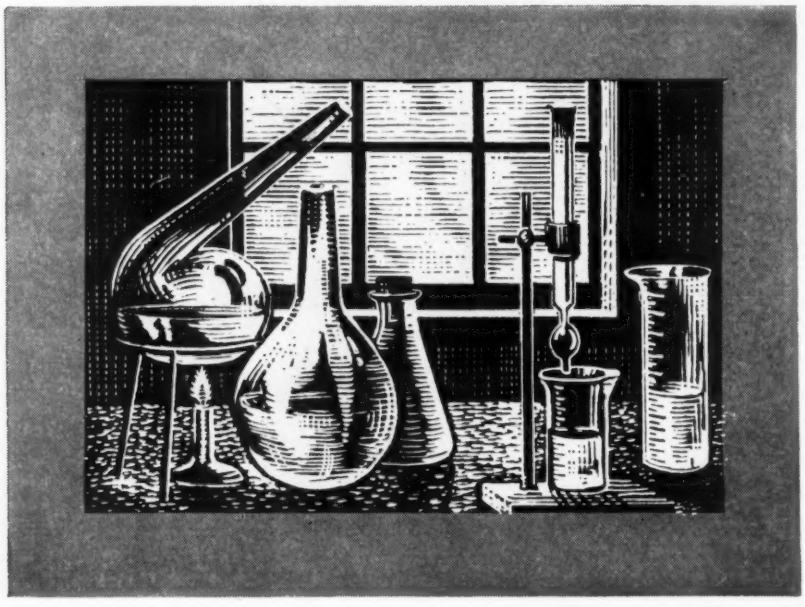
INTERVIEWS WITH TECHNICAL PERSONNEL FROM THE AGFA PLANT AT WOLFDEN (PB-1312); photostat, $3.; microfilm, 50 cents; 46 pages.

AGFA COLOR NEGATIVE-POSITIVE METHOD FOR PROFESSIONAL MOTION PICTURES: (PB-15476); mimeographed copy, $1; 32 pages.

I. G. FARBEN AGFA SUBSIDIARY, WOLFDEN, GERMANY (PB-28335); photostat, $1; microfilm, 50 cents; 5 pages.

PRODUCTION OF STYROFLEX FILM (PB-44965); photostat, $2; microfilm, $1; mimeographed, 75 cents; 32 pages, including drawing and appendix.

All orders, with remittances, should be addressed to the Office of Technical Services. Department of Commerce, Washington 25, D. C.



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Peck Appointed to Research Post

W. S. Peck, appointed director of research, American Dyewood Co. Dr. Peck will make his headquarters at the company's research laboratory, Belleville, N. J.

Acetic Unit on Auction Block

A plant equipped to produce 280,000 pounds of glacial acetic acid and 1,440,000 pounds of acetic anhydride daily is being offered by War Assets Administration for sale or lease in whole or in any part.

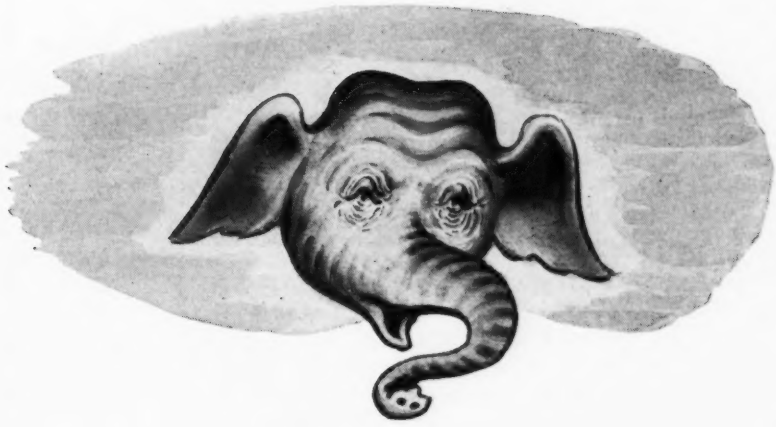
The property, located at Kingsport, Tenn., is known as "Plant A" of the Holston Ordnance Works. It occupies 94 acres with buildings containing 450,000 square feet of floor area.

The processes that were used at this plant and some of the equipment employed are subject to private patent rights which are not, in any way, controlled by WAA.

Chemicals Wanted

The following chemicals are wanted by the National Registry of Rare Chemicals, Armour Research Foundation, 33 Federal and Dearborn Sts., Chicago 16:

Methylpropylbenzenes
Butylcyclopentane
1-Butyne
Erythritol
8-Quinolinesulfonic acid
Laccase
Barium beryllonate
Lead tetraoxysulfate
Cobaltic sulfate
Nickelic sulfate
Aryl and alkyl mono- and dicyclohexylamines
1-Glyceraldehyde
Glutaconic acid
1-Glyceric acid
Gallium metal and salts
Hydrindene
1 (+)-Glutamine
9-Amylanthracene
Tropic acid
Pyrroline
Pyrrolidine
2-Pyridine aldehyde



Remember when things were tight?

Remember when you called HARDESTY and they made prompt delivery on Fatty Acids? Remember when HARDESTY technicians supplied the answers to the problems created by the shortage of imported raw materials?

Fats and oils are still tight but HARDESTY continues to offer the service and quality that has paid off for you in the past. The high quality of every HARDESTY shipment is a direct outgrowth of HARDESTY'S never-ending research. Our fund of technical knowledge and experience, plus greatly expanded facilities are ready to go to work for you.

That is why we say it will continue to pay you to keep in touch with HARDESTY now that fats and oils are off allocation and getting back to normal.

W. C. HARDESTY COMPANY, 41 East 42nd Street, New York 17, N. Y. FACTORIES: Dover, Ohio—Los Angeles, California—Toronto, Canada.

HARDESTY PRODUCTS: Stearic Acid—Red Oil — Glycerine — Stearine Pitch—White Oleine — Hydrogenated Fatty Acids—Animal & Vegetable Distilled Fatty Acids

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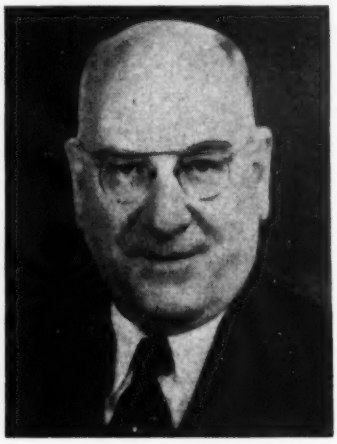
CALENDAR of EVENTS

AMERICAN ASSOCIATION OF CEREAL CHEMISTS, 32nd annual convention, Hotel President, Kansas City, May 19-23.
AMERICAN CERAMIC SOCIETY, annual meeting, Atlantic City, April 21-25.
AMERICAN CHEMICAL SOCIETY, 111th national meeting, Atlantic City, April 14-18.
AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, summer meeting, Montreal, June 9-13.
AMERICAN MANAGEMENT ASSOCIATION, Annual Packaging Exposition, Convention Hall, Philadelphia, April 8-11.
AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION, annual meeting, Boca Raton Hotel, Boca Raton, Fla., April 28-30.
AMERICAN SOCIETY FOR TESTING MATERIALS, 50th annual meeting, Atlantic City, June 16-20.
CHEMICAL INSTITUTE OF CANADA, annual conference, Banff, Alberta, Canada, June 8-11.
ELECTROCHEMICAL SOCIETY, INC., Brown Hotel, Louisville, April 9-12.
XITH INTERNATIONAL CONGRESS OF PURE AND ALLIED CHEMISTRY, London, July 17-24
NATIONAL ASSOCIATION OF CORROSION ENGINEERS, annual convention and exhibition, Palmer House, Chicago, April 7-10.
NATIONAL ASSOCIATION OF INSECTICIDE AND DISINFECTANT MANUFACTURERS, midyear meeting, Edgewater Beach Hotel, Chicago, June 9-11.
NATIONAL FARM CHEMURGIC COUNCIL, INC., 12th annual conference, Oklahoma City, March 26-29.
NATIONAL FERTILIZER ASSOCIATION, annual meeting, Essex and Sussex Hotel, Spring Lake Beach, N. J., June 19-21.
NATIONAL PLASTICS EXPOSITION, second, and annual national convention of *SOCIETY OF THE PLASTICS INDUSTRY,* Coliseum, Chicago, May 6-10.
PACIFIC CHEMICAL EXPOSITION, San Francisco Civic Auditorium, San Francisco, October 21-25.
SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS' ASSOCIATION, Commodore Hotel, New York City, April 9.

Royer Joins U. S. Stoneware



Hubert Royer, formerly with General Ceramics & Steatite Corp., has joined The U. S. Chemical Stoneware Co. as sales manager of its Chemical Stoneware Division. He will be located at the New York office.

Solicit Ideas for National Defense

The National Inventors Council invites scientists and engineers to submit ideas for possible defenses against such modern weapons as the rocket, the guided missile and the atomic bomb.

The Council, composed of industry and government personnel, was established to review inventive suggestions related to National defense and to recommend to the armed forces any that appear to have possible application. Durng the war it reviewed more than 200,000 proposed military devices.

COMPANIES

Diamond Alkali Buys Plant Site

About 1,756 acres of vacant land, acquired by the government in connection with the housing project at Eleanor, W. Va., has been sold to the Diamond Alkali Co. for $77,767.

The new owner plans to build a plant on the tract which is in the Kanawha Valley section of West Virginia.

Hooker Plans New Product Expansion

With $5 million committed to expansion and modernization of plant facilities, Hooker Electrochemical Co. expended $2.3 million last year as an initial part of its program. Among the installations completed were units for the production of DDT, hexachlorcyclohexane and monochloracetic acid. In addition the engi-

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F. O. MOTHICIDE

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SAVE SCARCE PARA OR NAPHTHALENE AND DOUBLE YOUR MOTHICIDE SALES!

A synergist (an activator) for either Paradichlorobenzene or Naphthalene. Carefully controlled entomological tests prove formulations using 50% POLYCHLOR 1940 and 50% Para render a mothicide equal to pure Para; 20% Naphthalene added to POLYCHLOR 1940 (without Para) produces a superior mothicide.

Large Quantities Available
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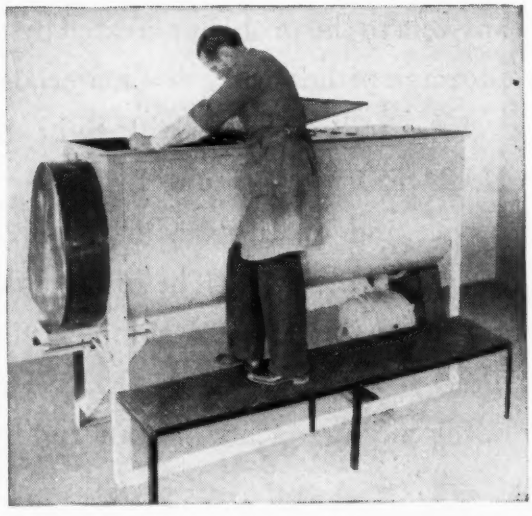

DO-ALL RIBBON MIXERS AND BLENDERS
New spiral type MIXERS for wet or dry mixing—rugged welded steel construction—built for hard service—available in 25 to 5,000 lb. sizes—standard or heavy duty. Available in stainless or mild steel.

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STAUFFER CHEMICALS FOR THE METAL INDUSTRY

Whether it's nitric acid for etching, sulphuric acid for pickling or other industrial chemicals used in the metal industry, you can depend on Stauffer for quality chemicals in quantity. Investigate Stauffer's facilities as a dependable source of supply on your chemical needs.

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*Aluminum Sulphate	*Copperas	Sulphur
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Carbon Bisulphide	Nitric Acid	*Superphosphate
Carbon Tetrachloride	Rochelle Salt	Tartar Emetic
Caustic Soda	Silicon Tetrachloride	Tartaric Acid
Chlorine	Sodium Hydrosulphide	Titanium Tetrachloride
Citric Acid	Stripper, Textile	

(*Items marked with star are sold on West Coast only.)

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555 South Flower Street, Los Angeles 13, Cal.
636 California Street, San Francisco 8, Cal.
North Portland, Oregon — Houston 2, Texas

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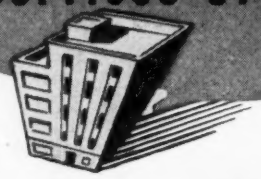

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without capital investment

Special Formula *Development, Production* and *Packaging*

We can meet your needs for—

Quantities too small or infrequent to warrant your own production;

Production involving ingredients or facilities not suited to your regular operation;

Centrally located production, packaging, and final shipping in one plant.

Our facilities, including laboratory control, are notably suited to difficult compounding and mixing to exact standards. Complete manufacturing service from buying through final shipping, or any single service you choose. Term or "batch" contracts.

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Write in confidence; tell us what type of materials would be used, approximate quantity of finished product required, package-size and services desired. We will report promptly with quotations.

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Special Formula Mixing Since 1909

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neering department designed a new electrolytic cell with more than twice the capacity of the Type S cell. This development has been placed in operation, and it is reported that although the floor space occupied is only slightly more than that of the Type S the efficiency is comparable.

The company's net sales during 1946 were $14,884,913 compared with $19,075,396 in the preceding year. The decrease in sales volume was due to the termination of wartime requirements for several special products. Except for these items both the Niagara Falls and Tacoma units have operated at full capacity.

Austin Names Hallenstein Vice-President

Harold A. Hallenstein, appointed to the recently created post of executive vice-president, The Austin Co., Cleveland. He has been a vice-president since 1935, and a director since 1937.

Schedule Output Of Heavy Carbon

Sun Oil Company reports that its plant under construction for the production of Carbon 13 is expected to be completed April 1. Because of the time involved in reaching equilibrium in the plant, it will be about July 1 before production is obtained.

Carbon 13 will be put out in the form of a solution of potassium bicarbonate. The concentration of Carbon 13 based on total carbon will be about 10 per cent.

Sharples-Continental Joint Enterprise

Sharples Continental Corp. has been formed by Sharples Chemicals, Inc., and the Continental Oil Company. This company will function as a manufacturing organization for production of synthetic organic chemicals from petroleum raw materials.

The first production unit will be located in Baltimore, Md., at the site of a former Continental Oil Company refinery. This plant will manufacture nonylnaphthalene, an alkylated aryl hy-

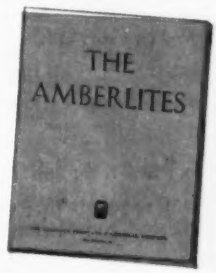
Amberlite deionized water stops corrosion and scale in Diesel-train heaters

Water impinges on the surface of the flash boiler in a Diesel train . . . turns instantly into steam . . . leaves no deposit to clog and corrode steam lines. It's AMBERLITE deionized water!

Industry after industry has turned to AMBERLITE Ion Exchange Resins to produce deionized water comparable in quality to single distilled; to soften boiler feed water; to reduce alkalinity and total dissolved solids; and regulate make-up quality with a minimum of equipment, space and maintenance.

You'll find, too, that in many chemical processes you can eliminate costly steps and improve quality with the AMBERLITES. Our staff will be glad to discuss potential applications of AMBERLITE IR-100 (cation exchanger) and AMBERLITE IR-4B (acid adsorbent).

Time-Tested Uses and New Ideas Worth Investigating



Our booklet "THE AMBERLITES" suggests many applications for these time-tested Ion Exchange Resins—some applications already commercially established, others pointing the way to new fields of investigation. For your copy of this booklet, address The Resinous Products & Chemical Company, Department CI-I, Washington Square, Philadelphia 5, Pa.

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Organic
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BASE:
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HYDROCHLORIDE:
Technical and Pure

Both base and hydrochloride are used in the manufacture of dyestuffs, intermediates and pharmaceuticals.

It is suggested for possible application as a reducing agent in metallic deposition and photographic processes.

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Benzilic Acid
Diphenyl Acetic Acid
Cinnamic Acid
Phenyl Acetic Acid
Uric Acid
Aluminum Isopropylate
Benzil
Ethyl Cyano Acetate
Diethyl Malonate
Guanidine Carbonate
Methyl Iodide
Phenyl Methyl Pyrazolone
Saponin
Phenylacetamide
Methyl Propyl Ketone

B. L. LEMKE & CO., INC.
Organic Chemicals Division
250 W. BROADWAY
NEW YORK 13, N. Y.

Plant & Laboratory: Lodi, N. J.

drocarbon, which serves as a raw material for the production of a wetting, washing and emulsifying agent of the alkyl-aryl sulfonate type. It will be marketed by Sharples Chemicals, Inc., under the tradename "Neolene."

Top executives of the new corporation are Paul Kendall, executive vice-president of Sharples Chemicals, Inc., and Harold Osborne, vice-president of Continental Oil Company. Both men will retain their respective positions with the parent companies.

Crossley Awarded A. I. C. Medal

M. L. Crossley, director of research, Calco Chemical Division, American Cyanamid Co., selected to receive the 1947 gold medal of the American Institute of Chemistry. Presentation of the medal will be made at the Institute's annual meeting in May.

McCarthy Chemical Plans New Unit

Construction of a $3 million chemical plant is planned by McCarthy Chemical Co., at Winnie, Chambers County, 55 miles east of Houston. It will be located near the McCarthy refinery and natural gasoline plant and will make aromatic and unsaturated chemicals, including benzene and styrene from petroleum. Other units may be built later. McCarthy was incorporated in October, 1946, with Glenn H. McCarthy as president; Frank B. Champion and G. M. McGranahan, vice presidents.

Heyden Extends Drug Activities

Heyden Chemical Co., New York, has acquired control of the Nyal Co. from Sterling Drug, Inc. The Nyal organization distributes some 200 over-the-counter drug items through a network of franchised retail outlets.

Five Heyden officials have been elected to the Nyal board of directors to replace Sterling personnel. They are: B. R.

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Trade Mark

ACETONITRILE
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A stable, clear, colorless liquid with an aromatic odor, forming a constant boiling mixture of approximately 84%. Acetonitrile and 16% water at 76°C.

Boiling Range	80-83° C.
Purity	99% min.
Acidity (as acetic)	0.2% max.
Specific Gravity @ 20° C.	.782-.785

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Fatty acids	Benzene
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Fatty acid glycerides	Fats
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An extraction agent
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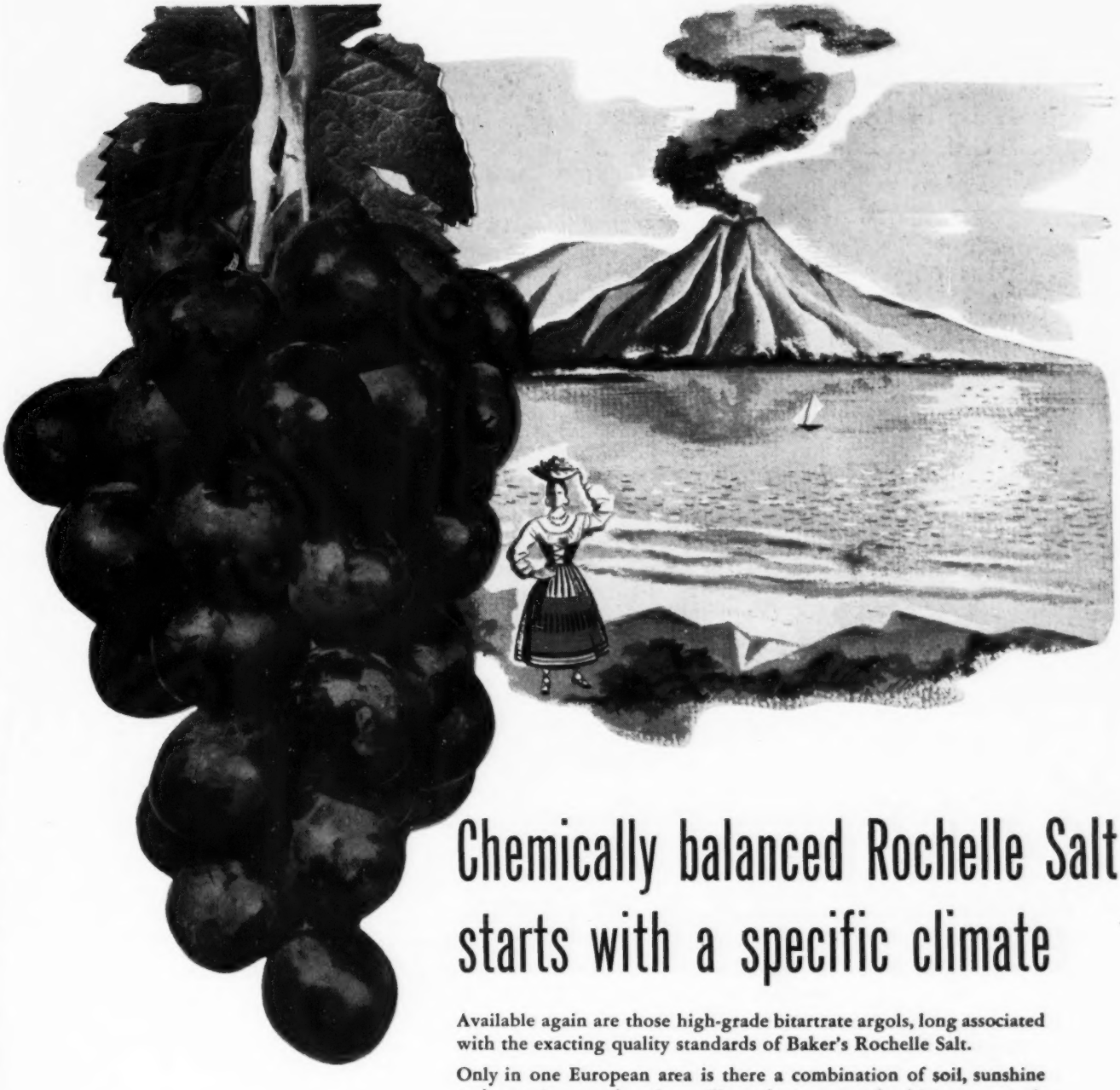

Chemically balanced Rochelle Salt starts with a specific climate

Available again are those high-grade bitartrate argols, long associated with the exacting quality standards of Baker's Rochelle Salt.

Only in one European area is there a combination of soil, sunshine and growing weather that will produce grapes for bitartrate argols acceptable to Baker.

For chemically balanced Rochelle Salt starts with exacting raws made possible in a specific climate.

If you manufacture a drug or pharmaceutical product that requires neutrality or chemical balance of each component part of Rochelle Salt, you will be interested in Baker's current production of this material.

Baker's Rochelle Salt dissolves quickly in solution. There is freedom from insoluble matter and heavy metals to an unusual degree. There is chemical balance between the alkali metals, Potassium and Sodium, and Tartaric Acid.

Whether you order Baker's Rochelle Salt, U.S.P., in granular or powder form, you will appreciate its uniformity of chemical and physical characteristics. Samples and quotations gladly sent upon request.

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Sodium Azide
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Acid
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Para Diazo-
dimethylaniline
Para Diazo-
diphenylamine

FAIRMOUNT
CHEMICAL CO., INC.
600 FERRY ST., NEWARK 5, N. J.

Armour, R. W. Harris, Paul Van Der Stricht, Gregory Stragnell, and H. A. Cheplin.

Dr. Cheplin is president of Jamieson Pharmacal Co., Detroit, drug manufacturing firm which Heyden bought in 1945.

Glyco Acquires Virginia Unit

The Marshall Chemical Warfare Service plant at Matrium, W. Va., used during the war for the large-scale production of chlorinated aliphatic solvents and hexachlorethane, has been leased from the United States Government by the Glyco Products Co., Inc., Brooklyn, New York. The plant, covering an area of over 84 acres adjacent to the Ohio River, is composed of 14 buildings.

The main building is a five story unit containing chlorinators and vacuum stills. Acetylene generators, purifiers, etc., are directly connected and housed in adjacent buildings.

The initial products to be made at the new unit will be monochlorbenzene, ortho- and para-dichlorbenzenes, and polyhydric alcohol esters.

The main plant of Glyco, at Brooklyn, will continue in operation as usual.

Amsco-Richfield Joint Enterprise

American Mineral Spirits Company, Western, has been formed recently as a corporation owned jointly by American Mineral Spirits Company, Chicago, and Richfield Oil Corporation.

All products marketed by Amsco Western will be made in the refinery of the Richfield Oil Corporation at Watson, California. California crude oil and catalytic cracked base stock will be processed into petroleum naphthas of both the aliphatic and aromatic types.

Max A. Williams, vice-president ot American Mineral Spirits Company, is president of American Mineral Spirits Company, Western. David E. Day, vice-president in charge of manufacturing for Richfield Oil Corporation, is executive vice-president, and A. J. Falkenberg is secretary and treasurer.

Hercules Earnings Gain

The 1946 annual report of Hercules Powder Company showed net income after all charges of $8,409,843. After payment of $437,440 dividends on preferred stock, net income applicable to the common stock was equal to $3.03 a share on 2,633,420 shares outstanding. These earnings were after a provision of $600,000 for contingencies.

In 1945, net income of the company was $4,925,800, after a provision of $200,000 for contingencies. These earnings were equal, after preferred dividends, to $1.68 a share of the present common stock.

During the year approximately $14,360,000 was expended for additional plant

NEW
LITHIUM
COMPOUNDS

The following new compounds of Lithium were developed originally for use in porcelain enamels.

They are offered now for investigation in other fields.

LITHIUM ALUMINATE
LITHIUM ANTIMONATE
LITHIUM COBALTITE
LITHIUM MANGANITE
LITHIUM METABORATE
LITHIUM METASILICATE
LITHIUM MOLYBDATE
LITHIUM TITANATE
LITHIUM ZIRCONATE
LITHIUM ZIRCONIUM SILICATE

Their unusual characteristics may be of interest.

Data and samples available upon request.

METALLOY
CORPORATION
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"VELSICOL" "1068"*

INSECT TOXICANT

This leader in the field of synthetic insect-toxicants has demonstrated a remarkable degree of efficiency in the control of household, institutional and agricultural pests. Deadly, powerful, and dependable, "Velsicol" "1068" insect toxicant is easily formulated as a base oil solution, a wettable powder, an insecticidal dust, and as an emulsion concentrate.

"Velsicol" "1068" insect toxicant is available in both the technical grade which consists of a minimum of 90% of the chlorinated hydrocarbon, $C_{10}H_6Cl_8$, and as the 20% concentration grade which is a 20% solution of the chlorinated hydrocarbon in refined kerosene.

VELSICOL LEADS the Insecticide Field!

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AR-50, AR-60 and AR-70 are ideal solvents and co-toxicants for the formulation of DDT concentrates with all-weather stability for cattle, dairy, and industrial sprays, household aerosols and agricultural dusts and sprays. NR-70 is easily formulated into mosquito larvicides and insecticides for the control of forest and shade tree insects.

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*U.S. Patents Pending

**U.S. Patent No. 2,347,265

VELSICOL

Samples and information about these "VELSICOL" Insect Toxicants and solvents will be sent upon request. You are invited to consult with Velsicol Entomologists concerning special problems.

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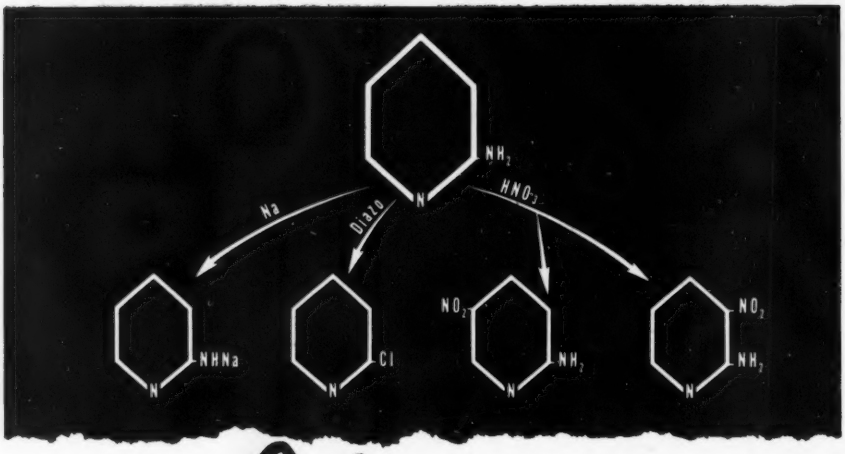
Geo. Missbach & Co., Atlanta 3 · Natural Products, Montreal, Canada



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facilities including those for naval stores and CMC (sodium carboxymethylcellulose) production facilities, now in operation, and for cellulose acetate and synthetic resins construction not yet completed. Strikes and delays in delivery of materials have delayed the construction of new plants and increased their costs.

Exports in the past year totaled $7,400,000, a smaller proportion of total sales than was usual prior to the war.

LoBue Founds Company

Philip J. LoBue, for the past six years director of the chemical sales division, Michigan Chemical Co., has resigned to form his own company for the manufacture and distribution of chemicals. Offices are at 70 E. 45th St., New York City.

Freeport Earnings Gain

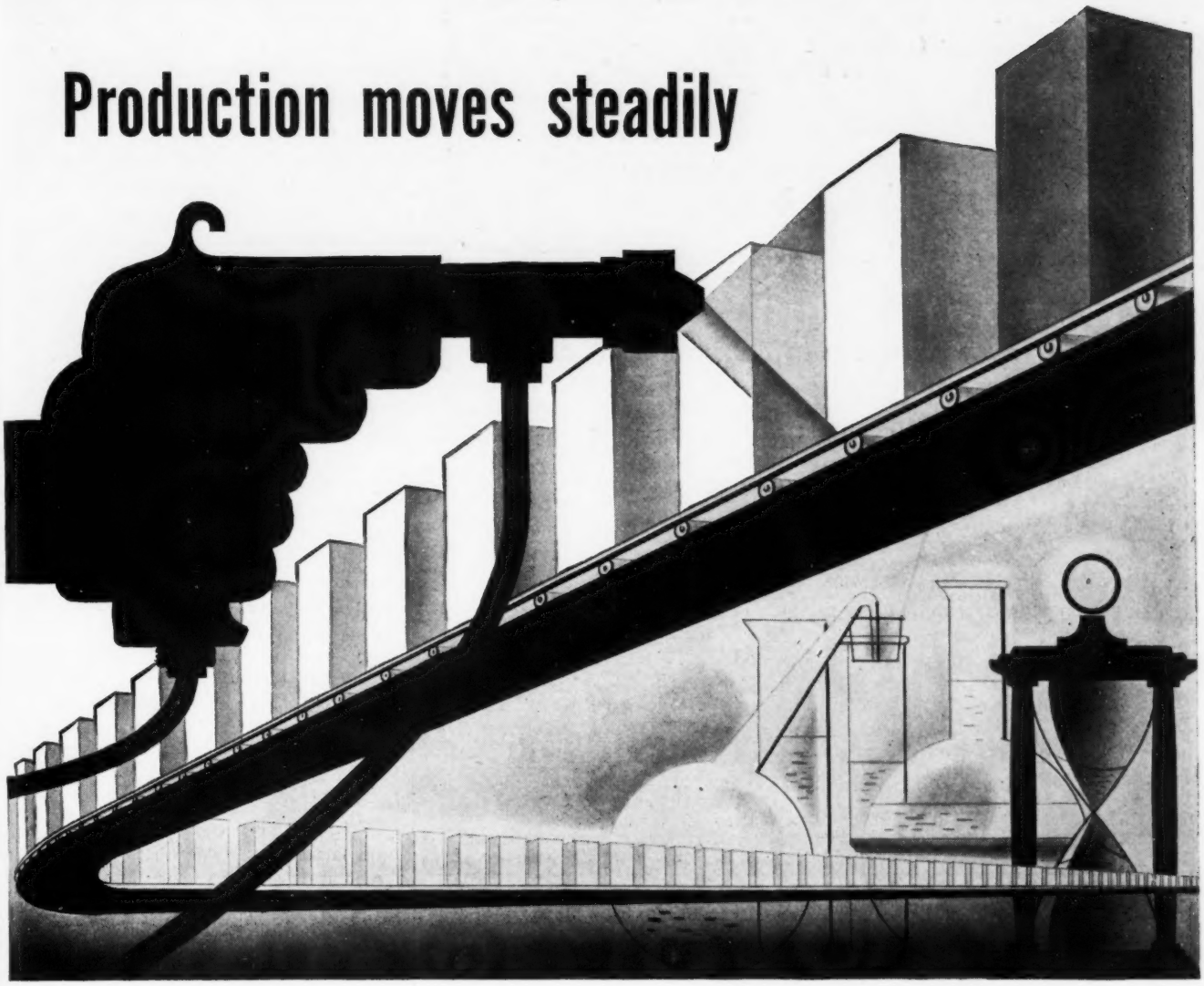
Net earnings of Freeport Sulphur Company for the year 1946 amounted to $3,753,316 after all charges, including depreciation, depletion, taxes and special reserves, or $4.69 a share on the 800,000 shares of common stock, according to the company's preliminary report submitted to directors by Langbourne M. Williams, Jr., president. These earnings compare with $3,349,790, or $4.19 a share, for 1945.

Of the Freeport earnings, $385,625 represented the company's portion of the earnings of its subsidiary, Cuban-American Manganese Corporation, as compared with $447,722 as its portion in 1945. Cuban-American Manganese Corporation was dissolved in December, and its assets consisting of cash and capital stock of Cuban Mining Company were distributed to stockholders.

Diamond Alkali to Move to Cleveland

Diamond Alkali Company has disclosed another project in its 1947 plans for expansion and rehabilitation of plants and facilities. Following a year-end announcement of a new $10 million alkali plant already under construction at Houston, Texas, and a modernization of its main operations at Painesville, Ohio, involving

Production moves steadily



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another $10 million, the company has decided to build an administrative office and a research and development laboratory near Cleveland, Ohio, at an estimated cost of $2 million.

This newest project of the company will be built on a tract of land approximating 80 acres located at Mayfield Heights, about 12 miles east of downtown Cleveland, and 18 miles from Painesville. The new Houston alkali plant and a new plant in Chicago for the production of silicate of soda, together with other modernization moves, will permit an increase in business volume of more than one-third over the approximate $30 million recorded in sales for the year 1946.

Schenley Expands Research

The Schenley Corp., which recently purchased the former Larkin estate, Croton, N. Y., is completing plans for the construction of new research laboratories at this location. A five-year building program is scheduled and it is anticipated that the laboratory will carry a staff of 100.

One of the factors influencing the selection of the Croton site was its proximity to New York, permitting ready communication with the company's executive offices.

Dow Reports Income

The unaudited consolidated net income of The Dow Chemical Co. for the six months ended November 30, 1946, was $6,099,205.27 which, after providing for dividends on the preferred stock, was equivalent to $4.39 per share on the common stock outstanding.

The net income was arrived at after deducting from income before taxes $781,-421.49 for portal-to-portal pay for the period June 1st to November 30, 1946, $552,748.00 for veterans' bonus (a non-recurring item) and $3,927,521.50 for Federal income taxes.

Sharp Gain in Pennsalt Profits

After deduction for Federal taxes, The Pennsylvania Salt Manufacturing Company reports net profits for the twelve months ending December 31, 1946, of $2,077,425.61 equivalent to $2.77 per share on 750,000 shares of $10 par stock outstanding, which compares with the earnings for the twelve months ended December 31, 1945, of $1,288,329.59 or $1.72 per share.

U. S. Rubber Income Establishes Record

Consolidated net sales and net income of United States Rubber Company in 1946 were highest in the company's history, according to the 55th annual report to stockholders released recently.

Net sales totaled $494,753,028, an increase of 4.9 per cent over sales of $471,-

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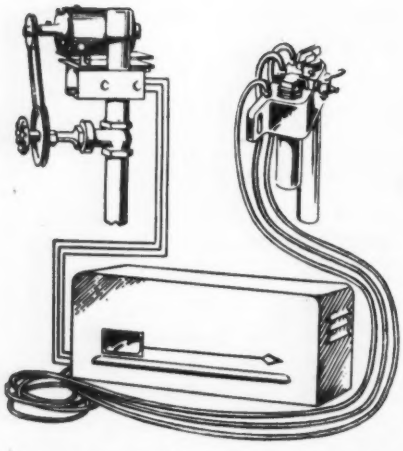

This apparatus eliminates both the frequent checking of classifier density and manual regulation of water by the attendant. Water dilution is regulated to maintain percentage of solids within close limits of any predetermined point. Thus, size of finished product is also controlled. Results in maximum efficiency in classification and grinding at optimum capacity.

Available with standard chart recorder or arm and weight for HEAVY MEDIA separation. Location widely optional. Many applications in nonmetallic and chemical plants, including potash and phosphate plants, coal washing, etc.

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506,473 in 1945. After deducting all charges, net income was $23,207,941, which was 4.7 per cent of sales. After allowing for $8.00 a share on the preferred stock, this amounted to $10.23 a share on the common stock. Net income for 1945 was $13,024,778, or $4.44 a common share.

The balance sheet of the company showed current assets of $187,151,930 against current liabilities of $68,668,142, giving a net working capital of $118,483,788, compared with $110,070,924 for the previous year, an increase of $8,412,864.

Freeport Promotes Wells

Richard C. Wells, assistant treasurer of Freeport Sulphur Co. has been elected controller of the company. He joined Freeport in 1939 after being graduated from Harvard.

Company Notes

CELANESE CORP. has begun construction of a $37 million cellulose acetate yarn plant at Rock Hill, South Carolina. Approval for the project was received from CPA in November.

The name of BECHTEL BROTHERS McCONE COMPANY, engineering and construction organization, has been changed to Bechtel Corporation.

Three subsidiaries are now respectively, Bechtel International Corporation; Compania Bechtel, S. A., and International Bechtel, Inc.

MONSANTO CHEMICAL CO. has a new plant for production of wood flour, under construction at Springfield, Mass.

Output of the unit will be consumed by the company's resin division.

UNITED STATES RUBBER CO. has acquired an interest in the North British Rubber Co., Ltd., of Edinburgh, Dumfries and London. Terms of the agreement between the two companies provide that the North British Company will manufacture goods for U. S. Rubber's British subsidiary, the Dominion Rubber Company, Ltd., for resale in Great Britain

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and for export from Great Britain. Arrangements have been made for a substantial and increasing participation by U. S. Rubber in the common stock of the North British Company.

The Rare Metal Products Co., Belleville, N. J., has moved its offices, plant, and laboratories to Atglen, Pa.

Corn Products Refining Co. has begun construction of a $10 million plant at Corpus Christi, Texas. It will manufacture starch and dextrose from milo maize. Grind capacity will be 20,000 bushels per day. Dextrose output is scheduled to approximate 100 million pounds a year.

Air Reduction Co., Inc., is carrying out a program of plant expansion involving the construction of eight new oxygen plants and additions to eleven existing units. The company's new mechanical research laboratory at Summit, N. J., is also expected to be ready for occupancy by the mid-year. It will have a staff of 250 technologists.

CANADA

New Chlorine Projects Scheduled

Few chemicals have attracted as much commercial interest in Canada during the past few years as has chlorine, and, of course, caustic soda. And there have been many rumors as to the future plans of several major companies, for, heretofore. Canada has had only one important chlorine producer—Canadian Industries, Ltd. (I.C.I.-du Pont).

But last month Standard Chemical Co., Ltd., officially acknowledged its intention to construct a $3.5 million, 18,000 ton chlorine capacity, unit at Sarnia, Ont. Initial production is scheduled for 1948. Simultaneously reports filtered out that Aluminum Co. of Canada, Ltd., also plans to undertake the installation of a unit of comparable size at power-rich Arvida, Que.

These projects will reduce Canada's need of chlorine imports—averaging 8 million pounds per annum during the war years—and will help to meet the burgeoning demands of the chemical and process industries.

Consolidated Dividend Distributions at Peak

Dividend distributions of Consolidated Mining & Smelting Co. of Canada, Ltd., major Canadian base metal refiner and chemical producer, reached a record $13,105,316 during 1946—up almost $2 million over the previous high of 1937. Working capital at the beginning of the year stood at $38.4 million, almost four times that of 1940.

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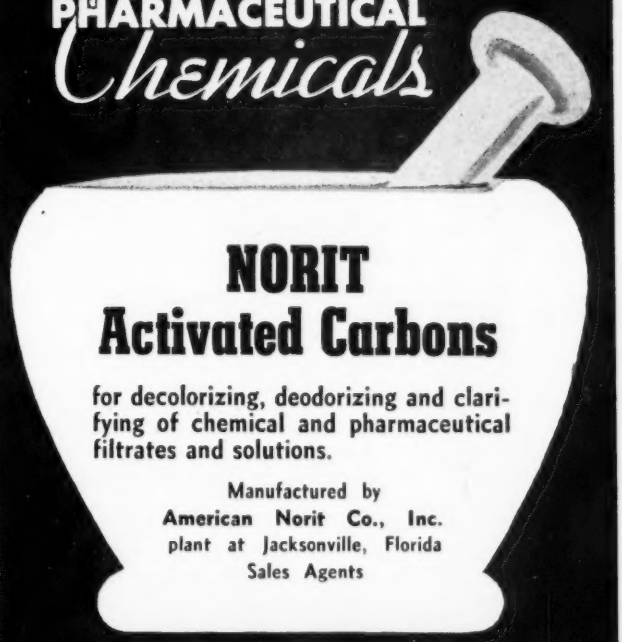

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Although a heavy share of last year's profits came from higher world prices which obtained for lead, silver, and zinc, a substantial percentage of income was derived from the company's fertilizer sales. Output of ammonium nitrate, phosphate, and sulfate compounds stood up well, with exports shipments being made to the United Kingdom, western United States, Hawaii, India, New Zealand, and Ceylon.

New Unit for Canadian Industries

Canadian Industries Ltd. (ICI-du Pont) is planning the construction of a new grinding, blending, and packaging plant for pesticides at Hamilton, Ont. Major emphasis will be placed on the output of DDT, rotenone, pyrethrum, arsenic and copper formulations, while the present facilities will be used exclusively for the manufacture of 2,4-D herbicides.

The company is also considering building a $500,000 salt refinery near Vermilion, Alta.

Company Notes

Western Canada Match Co., Ltd., Victoria, B. C., has begun production at its $150,000 plant at Esquimalt, B. C. Output will be divided between domestic and export markets. This factory is the only match producer west of Ontario.

Barringham Rubber & Plastic Co., Ltd., Oakville, Ont., has begun construction of a $750,000 addition to its facilities for the manufacture of unsupported plastic sheeting, rubber-coated, and plastic-coated fabrics. The new facilities, scheduled to be completed by late this year, will triple the concern's capacity and permit a gross sales of about $7.5 million per annum.

Frederick H. Levey (Canada) Ltd., subsidiary of Columbian Carnon (Delaware), New York, has purchased five acres near Toronto as a site for a new printing ink plant. Dominion Printing Ink & Color Co., and Hoops Printing Ink Co., Toronto divisions of the parent company, will be amalgamated with the new development. Canada's printing ink production: $3.5 million per annum; imports, $400,000.

PERSONNEL

New Davison Vice-Presidents

Four executives of Davison Chemical Corp., Merlin G. Geiger, Elmer B. Dunkak, G. Miller Hebbard, and Charles E. Waring, have recently been named vice-presidents of the company.

Mr. Geiger, formerly with Westvaco Chlorine Products Co., assumed the position of executive vice-president, and Mr. Dunkak was appointed vice-president. Dr. Hebbard and Dr. Waring were

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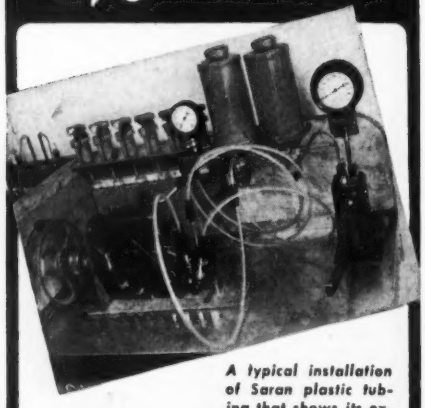

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named vice-presidents in charge of operations, and research and development, respectively.

Meintz Joins Great Lakes Carbon

Ralph E. Meintz, formerly technical director of Fischer Industries, Cincinnati, has recently accepted the position of superintendent of the reactive carbon plant, Great Lakes Carbon Co., Chicago.

This new unit, now under construction is expected to be in operation by mid-year.

Mutual Advances Moore

Thomas P. Moore, named sales manager of Mutual Chemical Co. of America. With Mutual since 1943, he was previously with General Chemical Co.

Jefferson Chemical Advances Executives

Max Neuhaus, formerly director of research of Jefferson Chemical Company, Inc., has been named manager of Jefferson's technical and research department, with Paul P. McClellan and John C. Paul as assistant managers.

Wm. H. Bowman, formerly Jefferson's market development manager, has been designated sales department manager, and G. W. Larson has joined the department's staff to take charge of its technical sales service work. Mr. Larson was until recently with the Barret Division of Allied Chemical and Dye.

Andrew Heads Gas Association

Charles G. Andrew, Air Reduction Company, Inc., was elected president of the Compressed Gas Manufacturers' Association at that group's annual meeting.

In addition to Mr. Andrew, other officers elected were: L. W. Hench, American Oxygen Service Company, 1st vice-president; Edmund Rowland, Henry Bower Chemical Mfg. Co., 2nd vice-president; and F. R. Featherston, secretary-treasurer.

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n-Capryl Aldehyde $CH_3(CH_2)_6CHO$	B.P. 167-172	100 g.
Propionitrile (Pract.) CH_3CH_2CN	B.P. 96-97	500 g.
n-Butyronitrile $CH_3(CH_2)_2CN$	B.P. 117-119	100 g.
n-Capronitrile $CH_3(CH_2)_4CN$	B.P. 161-164	100 g.
ortho-Tolunitrile $CH_3C_6H_4CN$	B.P. 93-94/18mm	100 g.
meta-Tolunitrile $CH_3C_6H_4CN$	B.P. 89-90/11mm	100 g.
para-Tolunitrile $CH_3C_6H_4CN$	M.P. 25-27	100 g.
Benzonitrile C_6H_5CN	B.P. 188-189	100 g.
meta-Nitrobenzonitrile $NO_2C_6H_4CN$	M.P. 115-116	10 g.
meta-Nitrophenol $NO_2C_6H_4OH$	M.P. 96-97	100 g.
meta-Nitrophenetole $NO_2C_6H_4OC_2H_5$	M.P. 31-32	10 g.
ortho-Iodotoluene $IC_6H_4CH_3$	B.P. 204-207	100 g.
meta-Iodotoluene $IC_6H_4CH_3$	B.P. 92-94/15mm	100 g.
para-Iodotoluene $IC_6H_4CH_3$	M.P. 34-35	100 g.
meta-Nitroiodobenzene $NO_2C_6H_4I$	M.P. 33-35	100 g.
alpha-Iodonaphthalene $C_{10}H_7I$	B.P. 159-161/14mm	100 g.
para-Aminobenzoic Acid $NH_2C_6H_4COOH$	M.P. 187-188	500 g.
Resorcinol Monoacetate (Pract.) $HOC_6H_4OCOCH_3$	B.P. 156-159/10mm	1 kg.

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A number of organic compounds heretofore unavailable except in the most limited quantities are about to go into research or pilot plant scale production. Inquiries are invited.

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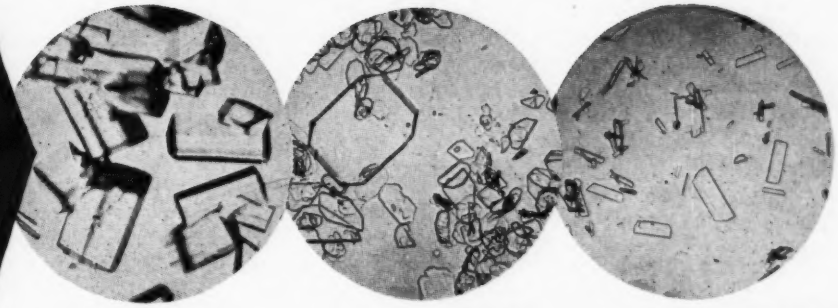

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CHEMICAL SPECIALTIES

A department devoted to news of the chemical specialties field. Descriptions of new specialty products will be found in the New Products & Processes department.

U.S.D.A. Approval Enhances 2, 4-D Prospects

The selective herbicide 2, 4-D, widely used for the past two years as a lawn weed killer, now is being recommended for killing weeds in some field crops. Weed control specialists of the U. S. D. A. are suggesting its use in wheat, oats, barley and sugar cane. Large scale tests have established the herbicide's worth as a means of increasing farm efficiency.

In the Red River Valley in North Dakota, for example, wheat fields badly infested with wild mustard, an annual weed, treated with 2,4-D produced 10 to 15 more bushels of wheat per acre than adjoining untreated fields. In Louisiana, where alligator weed, an amphibious plant, spreads from the bayous to the cane fields, farmers are using the chemical in combating the pest that has choked out many fields. Previously, flame cultivators gave the only means of control, as cultivation by plowing merely spreads it. The chemical treatment appears just as effective as flame, and is cheaper.

It is generally agreed that sodium or amine salt of 2,4-D can be used in destroying susceptible annual weeds growing in wheat, oats, and barley; that the ester forms (alcohol base) of 2,4-D, often more effective with stubborn weeds than sodium salts, might be used in controlling broadleafed shrubs and weeds on rights-of-way by railroads, State highway departments, and power companies; that the sodium salt of 2,4-D is useful to prevent seed formation of bindweed, Canada thistle, and certain other deep-rooted perennials—the so-called noxious weeds. It is recommended also that spraying of poison ivy be confined to early summer when the plant is making its first growth.

Experimental results with the deep-rooted perennials still are inconclusive as to whether repeated treatments will completely eradicate these weed pests. It is known, however, that annual treatments will keep them under control.

SAE Establishes Brake Fluid Standards

First SAE standard for hydraulic brake fluids used in motor vehicles has been approved by the Technical Board of the Society of Automotive Engineers for publication in 1947 SAE Handbook.

The standard, outgrowth of work initiated in 1936, was prepared by the Hydraulic Brake Fluid Subcommitte comprised of engineers from the staffs of manufacturers of hydraulic fluids, brakes, and vehicles. It covers heavy-duty and moderate-duty fluids, outlines minimum performance requirements, physical properties, detailed test procedures and apparatus.

Specifications establish such properties as viscosity and water tolerance; boiling, flash, and cold points; neutrality, stability, rubber swelling, and corrosion limitations. Heavy-duty fluids, for use under severe operating conditions, have a temperature range of 40 degrees below zero Fahrenheit to 130 degrees above. Moderate-duty fluids, for lighter service, have a temperature range of 30 below to 130 above.

Peterjohn Joins Hall

Alvin C. Peterjohn, appointed technical director of the C. P. Hall Co., Akron. Associated with the rubber industry for some years, he was formerly with Standard Products Co.

Drain Pipe Cleaner Composition

A composition designed recently to be used for clearing grease-clogged drains, patented by the Drackett Co., contains as essential ingredients, aluminum powder, sodium chlorite, and caustic soda.

The compound specified consists of 3 per cent aluminum, 10 per cent sodium chlorite, and 87 per cent caustic soda.

DDT Shows Promise In Borer Control

Attempts to control outbreaks of the squash borer on squash and pumpkins with DDT gave excellent results in tests carried on at the Experiment Station at Geneva, N. Y., so far as killing the borer grubs was concerned. Some varieties, however, were severely stunted by the use of this new insecticide, with consequent reduction in yield, according to L. A. Carruth, Station entomologist.

The tests indicate that it is unsafe to use DDT dusts indiscriminately for squash borer control. Further tests under different conditions of weather and borer infestation are needed before its use on squash can be recommended without reservations. The wisest course at present is to use the safer, even if somewhat less efficient, 1 per cent rotenone dust.

Hollingshead Introduces New Specialties

R. M. Hollingshead Corp., Camden, N. J., has recently placed two new specialties on the market, and is completing plans for national distribution and heavy advertising support.

One item, Whiz Mirror and Glass Finish was first market-tested in Syracuse last September. Since then similar campaigns have been conducted in several other cities. According to the manufacturer, it was developed during the war and was used to remove dirt and oil from glass and plastic installations on airplanes. It is a wipe-on, wipe-off liquid polish which sells for 60c for a 16 ounce can.

The other new product is tradenamed Whiz-3-Way Protection. Basically it is a drycleaner which has an open-cup flash point of 130. It is claimed that articles immersed in the cleaner will not only be cleaned but will also be mothproof for a year as well as water repellent and stain resistant.

It is packaged in gallon size containers only and retails at $1.98.

Garbage Deodorant Introduced by Drackett

Garbex, a crystalline product which when sprinkled on fresh garbage prevents formation of disagreeable odors, is being test marketed in five southern cities by The Drackett Co., Cincinnati, makers of Drano and Windex. If the tests prove successful, the company plans national distribution through retail stores.

Garbex was developed and first introduced about eight years ago by the Sherco Products Co., of Syracuse, N. Y. Distribution was regional only, however, and the product was discontinued entirely after a few years of moderate success. The Drackett Co. purchased the original formula and has spent the past eighteen months developing an improved product and subjecting it to a variety of laboratory and field tests.

The active ingredient of Garbex is an iron salt which prevents bacterial decay. It is said to be effective on any type of garbage and, in addition to acting as a preservative, virtually eliminates the attraction of insects and animals to the

garbage. It also provides some drying action.

Trade acceptance of the new product is reported to be remarkable. It is marketed in 1-lb. shaker-top containers which retail at 15 cents. Directions call for sprinkling a light layer on top of the garbage each time it is put in the can.

Buffet Advanced by Pittsburgh Plate

George M. Buffett, named technical director of Pittsburgh Plate Glass Co.'s new paint plant at Springdale, Pa. He has been located at the Milwaukee unit for the past 19 years.

Glidden Extends Specialty Activities

Glidden Co., Cleveland, long identified with the production of paints and varnishes, is completing plans for the distribution of a new line of specialties.

To be marketed under the tradename of Glid-X, the products will include a detergent for washing dishes, woodwork, linoleum etc., a household DDT spray a 2, 4-D weedkiller; and various wax, polishes, as well as a new paint brush restorer.

Handled by the paint and varnish division, the new line will be distributed through franchised dealers.

Alginic Acid Replaces Casein

Alginic acid from marine plants proved a good substitute for casein in a German-developed paint emulsion described in a report issued by the Office of Technical Services, Department of Commerce. Paint films containing the alginic acid emulsifier "Hegoid-Z-10" are said to give a durable glossy finish to wood, brick or cement.

Originally the alginic acid paint emulsions were intended for camouflage and other purposes not requiring a paint of great durability. However, the good gloss and wearing qualities of the algae-containing films brought about their wide use both indoors and out.

"Hegoid-Z-10" gives a film with greater similarity to oil paint than is possible with casein. In addition, a chemical reaction which takes place upon exposure to air makes the film water insoluble, thereby improving its weathering qualities.

The report contains process information on the digestion of algae by ammonium carbonate and zinc chloride, preparation of a binder for removing undigested algae and the manufacture of pigment-containing emulsions.

Novel Resin-Metal Compositions

In U. S. Patent 2,394,993, H. A. Gardner explains how light porous compositions having a metallic appearance are obtained when a metal powder is combined with a binder composition capable of reacting with the metal with evolution of a gas. Any metal or alloy can be used, but alumium, magnesium, or the like, with a low specific gravity, are preferred. The binder consists of one of several acidic or acid-containing compositions, including resinous derivatives of glycerine and phthalic anhydride.

In a recommended procedure, 100 parts of phthalic anhydride and a 0.5 of its molecular weight of glycerine are heated to about 200°C. Twenty parts of aluminum are added to the product of the reaction. The porous products thus obtained have a honeycomb structure and can be worked with tools. The products float on water and are non-conductors of electricity, heat, and sound.

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CHEMICAL ECONOMICS & STATISTICS

High Prices Fail to Boost Zinc Output

Despite an average market price for Prime Western grade zinc, St. Louis, which was greater than any year since 1917, the domestic mine production of zinc continued to decline in 1946 for the fourth consecutive year and reached the lowest level since 1938, according to the Bureau of Mines.

In 1946 the total mine production of recoverable zinc in the United States (including that recovered as zinc pigments and salts directly from ore) was 565,787 short tons, a decrease of 8 per cent from 1945. At the average weighted yearly price of $0.124 per pound, which includes allowance for premiums paid for over-quota production, the 1946 output was valued at $140,315,176. This compares with a value of $141,302,340 in 1945, which was calculated at the average weighted price for that year of $0.115.

Pulp and Paper Output Maintained

The production of paper and board during November declined from the high level established in October, reflecting the shorter working month. Preliminary data, released by the Bureau of the Census, showed total production of paper, paperboard and building board of 1,672,960 tons. While 78,000 tons below the October record, this figure represents a gain of 169,000 tons over November, 1945.

Receipts of pulpwood during the month at 1,384,649 cords, some 320,000 cords below the October figure, were insufficient to maintain the high rate of consumption, necessitating a withdrawal from inventories of some 200,000 cords which, however, did not affect the substantially favorable inventory situation. Consumption of pulpwood in November amounted to 1,585,565 cords.

November wood pulp production at 936,574 tons, while 36,000 tons below October, was about 90,000 tons above the November 1945 figure. Consumption of wood pulp in the manufacture of paper and paperboard was 1,048,749 tons, only 40,000 tons below October and 82,000 tons above November 1945. Inventories of pulp at pulp, paper and paperboard mills continued to decline. On November 30, inventories of wood pulp at pulp mills were 74,806 tons and at paper and paperboard mills, 429,760 tons.

Natural Gas and Petroleum Up

New production records were established in all branches of the petroleum and natural gas industries in 1946.

The record production of crude petroleum in 1946, estimated at 1,731 million barrels, was 1.2 per cent greater than in 1945. The estimated value of crude petroleum at the well was $2,440,000,000, including subsidies for stripper wells. This total value represents an increase in the average value at the well from $1.22 per barrel in 1945 to $1.41 per barrel in 1946.

Total demand for all oils in 1946 is estimated at about 1,927 million barrels compared with 1,952 million in 1945—a decline of about 1.3 per cent. All of this decline was in exports, and domestic demand may have exceeded that in 1945. The most notable factor in domestic demand was the large civilian consumption of motor fuel, particularly for automotive use.

Stocks of all oils probably increased about 55 million barrels during 1946. Part of this increase was a normal replacement of depleted stocks, but the total increase indicates that primary production and imports materially exceeded requirements.

The marketed production of natural gas increased to about 4,040 billion cubic feet in 1946, a gain of 4 per cent over 1945 characterized by continued increases in domestic and commercial consumption. The total value at points of consumption was about $835,000,000 in 1946.

Natural gasoline and cycle plants extracted about 4,836 million gallons of liquid products from natural gas in 1946, or 3 per cent more than in 1945. The value of all products at the plants amounted to about $186,000,000 in 1946, slightly below the 1945 total owing to lower prices received until the late months of 1946.

New High in Sulfur Output

Output of native sulfur in December continued very high and carried 1946 production to the new historical record of 3,859,642 long tons, according to the Bureau of Mines, United States Department of the Interior.

Mine shipments in 1946 were again higher than production, as they have been every year since and including 1943, resulting in a further decrease of stocks to 3,769,368 tons. The war-time peak in stocks was 5,148,206 tons, held by producers at the end of January 1943.

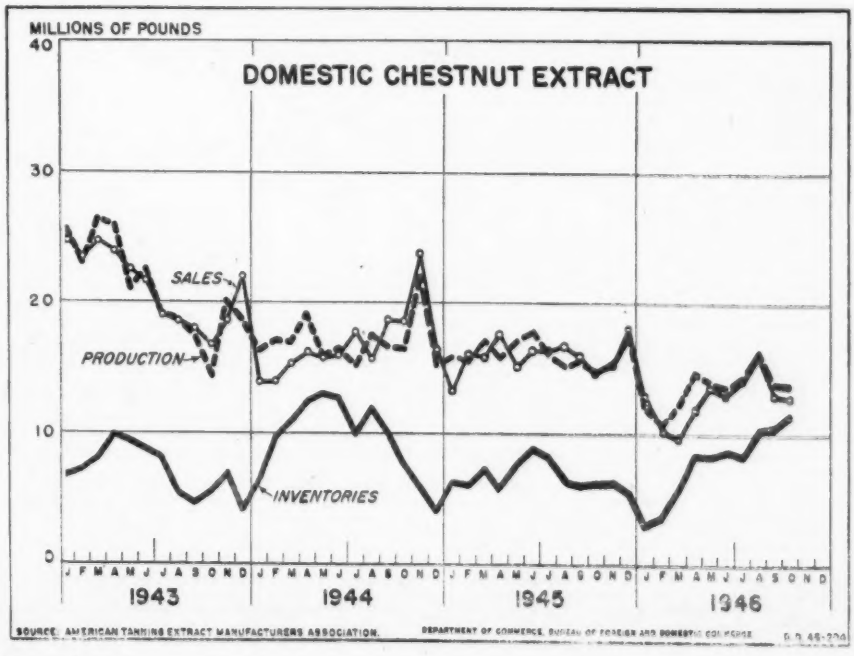
Record Potash Shipments

The five major American potash producers continued their high rate of deliveries during the third quarter of 1946, topping the 1945 record.

The total for domestic use and exports amounted to 394,566 short tons of potash salts equivalent to 216,073 tons K_2O.

Agricultural deliveries in the United States, Canada, Cuba, Puerto Rico, and Hawaii amounted to 361,669 tons of salts, equivalent to 195,641 tons K_2O, comprised of 282,946 tons muriate of potash, 25,960 tons of manure salts, and 52,764 tons of sulphate of potash and sulphate of potash-magnesia. The chemical industry took 32,066 tons of muriate of potash and sulphate of potash, equivalent to 19,968 tons K_2O. Other exports were 831 tons of salts containing 465 tons K_2O equivalent.

During the first nine months of 1946,


MILLIONS OF POUNDS
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DOMESTIC CHESTNUT EXTRACT
SALES
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SOURCE: AMERICAN TANNING EXTRACT MANUFACTURERS ASSOCIATION.

total deliveries amounted to 1,249,273 tons of potash salts equivalent to 694,876 tons K_2O, an increase of 4.6% in salts and 7.3% in K_2O over the corresponding period in 1945. Potash for agricultural use in the United States, Canada, Cuba, Puerto Rico, and Hawaii consisted of 1,149,886 tons of salts, 932,741 tons of muriate, 71,089 tons of manure salts, and 46,056 tons of sulphate of potash and sulphate of potash-magnesia, equivalent to 633,086 tons of K_2O, representing increases of 5.2% in salts and 10.1% in K_2O. Deliveries to the chemical industry amounted to 88,183 tons of muriate of potash and sulphate of potash, equivalent to 55,000 tons K_2O, representing decreases of 20.0% in both salts and K_2O compared to 1945. Other exports totaled 11,203 tons salts, equivalent to 6,790 tons K_2O, an increase of 72.5% in salts and 75.9% in K_2O over 1945.

Fertilizer Exports and Imports Decline

Exports of fertilizers and fertilizer materials for November 1946 totaled 91,000 short tons with a value of $1,367,000, according to The National Fertilizer Association. Records of the U. S. Department of Commerce indicate that November exports were lower in tonnage than for any other month of 1946 except September and lower in value than for any month except October. November exports were 29 per cent lower, on a tonnage basis, than for a year ago but were 8 per cent higher than for November 1944. November totals were lower than those for October chiefly because of a marked decrease in the amount of land pebble rock shipped out.

Cumulative January-November exports, however, totaled 1,149,000 tons, with a value of $20,548,000. This tonnage was 26 per cent greater than for the similar 1945 period and 40 per cent greater than in 1944 at the same time, while the value was 34 per cent greater than for 1945 and 44 per cent greater than for 1944.

Exports for July-November 1946, the first five months of the current fiscal year, were 9 per cent less by weight but 1 per cent greater by value when compared to the similar period in 1945.

November imports of fertilizers and fertilizer materials were lower, both as to weight and value, than for any previous month of 1946. Compared with November 1945, however, imports were only 1 per cent lower by weight and were 11 per cent greater by value. The total of 77,000 short tons valued at $2,702,000 for November 1946 was 32 per cent less by weight and 10 per cent less by value than for the same month in 1944. November imports were lower than those for October largely because of decreased imports of sodium nitrate, ammonium phosphates, and the items in the "all other phosphates" group.

PRODUCTION OF SYNTHETIC ORGANIC CHEMICALS

Chemical[1]	Unit of quantity	August 1946	September 1946	October 1946	November 1946
Acetanilid, tech. and U.S.P.	Lb.	493,197	....	1,134,531	927,838
Acetic acid:					
Synthetic	Lb.	24,383,068	21,933,741	24,980,326	25,446,232
Recovered	Lb.	94,679,656	96,836,421	110,563,661	106,113,609
Natural[2]	Lb.	2,676,437	2,655,615	2,806,758	2,397,164
Acetic anhydride[3]	Lb.	39,964,493	41,209,257	46,376,409	45,032,579
Acetone	Lb.	30,016,254	29,120,588	25,975,688	31,401,942
Acetylsalicylic acid	Lb.	459,677	573,785	710,143	1,009,890
Aniline	Lb.	8,326,193	6,316,897	8,924,437	8,119,934
Barbituric acid derivatives:[4]					
5-Ethyl-5-phenylbarbituric acid and salts (Phenobarbital)	Lb.	27,310	30,853	29,683	29,130
5-Ethyl-5-(1-methylbutyl)-barbituric acid and salts (Pentobarbital)	Lb.	3,012	....	n.a.	n.a.
Benzene: (Benzol)					
Motor grade:					
Tar distillers[5]	Gal.	526,022	572,921	810,345	613,312
Coke-oven operators[6]	Gal.	3,220,789	2,862,437	3,099,833	2,176,261
All other grades:					
Tar distillers[5]	Gal.	1,142,284	1,423,526	1,208,588	1,367,983
Coke-oven operators[6]	Gal.	10,617,860	11,246,342	11,208,111	11,821,145
Butyl alcohol, primary, normal	Lb.	10,250,404	10,249,071	8,670,507	12,705,974
Carbon disulfide	Lb.	24,117,958	26,457,725	27,444,008	25,693,583
Carbon tetrachloride	Lb.	13,474,610	13,173,641	16,527,880	11,798,312
Chlorobenzene, mono	Lb.	22,157,017	21,549,759*	22,360,088	23,185,277
Creosote oil:					
Tar distillers[5]	Gal.	10,875,534	11,142,216	12,202,721	9,484,579
Coke-oven operators[6]	Gal.	2,991,576	2,765,474	4,148,976	3,542,876
Cresols:[7]					
Meta-para	Lb.	977,008	804,222	414,783	308,386
Ortho-meta-para	Lb.	739,052	380,909	832,095	627,118
Cresylic acid, refined[7 8]	Lb.	2,339,110	2,283,728	2,455,799	2,100,412
Dibutyl phthalate	Lb.	1,329,821	1,221,936	1,481,857	1,643,933
Dichlorodiphenyltrichloroethane (DDT)	Lb.	4,020,189	3,855,842	3,788,544	3,582,138
Dyes (commercial concentrations):					
C.I. 202 Chrome blue black R	Lb.	183,943	182,418	234,081	115,552
C.I. 581 Direct black EW	Lb.	756,266	745,046	840,972	664,349
C.I. 1114 Anthraquinone vat blue BCS 20%	Lb.	167,587	182,774	135,920	97,319
F.P. 302 Naphthol AS	Lb.	....	90,813	87,327	....
Ethyl acetate (85 percent)	Lb.	8,121,625	7,334,167	8,744,934	10,170,182
Ethyl ethers, tech. and U.S.P.	Lb.	3,585,867	3,079,223	3,003,670	3,113,396
Formaldehyde (37 percent by weight)	Lb.	38,149,391	36,735,289	41,863,814	41,470,060
Lakes: Peacock blue	Lb.	243,067	200,672	241,355	225,164
Methanol:					
Natural[9]	Lb.	1,303,844	1,220,784	1,464,220	1,392,342
Synthetic	Lb.	45,305,406	43,773,153	43,776,937	44,316,435
Naphthalene:					
Tar distillers:[5]					
Crude, solidifying at—					
Less than 79° C	Lb.	16,177,971	17,203,040	17,351,924	13,929,474
Refined, solidifying at—					
79° C. and over	Lb.	7,501,829	8,154,983	8,752,881	8,105,767
Coke-oven operators:[6]					
Crude, solidifying at—					
Less than 79° C	Lb.	7,771,396	7,537,392	8,425,254	7,891,531
Penicillin[4]	Million Oxford units.	2,100,362	2,214,209	2,633,629	2,721,866
Phenol (synthetic and natural) tech. and U.S.P.[7]	Lb.	14,812,191	13,734,526	18,369,252	18,307,208
Phthalic anhydride	Lb.	8,466,990	9,333,857	9,275,629	11,245,647
Styrene (Government owned plants only)	Lb.	33,200,339	30,613,972	29,960,223	29,321,428
Sulfa drugs:[4]					
Acetylsulfathiazole	Lb.	....	....	n.a.	n.a.
Sulfanilamide	Lb.	....	....	n.a.	n.a.
Sulfathiazole	Lb.	....	....	....	....
All other	Lb.	288,521	425,437	491,639	496,798
Tetramethylthiuram sulfides	Lb.	....	348,779	148,258	319,169
Toluene:					
Coke-oven operators[6]	Gal.	1,255,713	1,472,389	1,466,888	1,733,010
All other[8 10]	Gal.	1,482,622	1,270,104	2,444,278	1,547,140
Vitamins:[4]					
Ascorbic acid and salts:					
Quantity	Lb.	55,893*	86,990	91,347	99,046
Value	....	n.a.	n.a.	n.a.	n.a.
Ergosterol, irradiated (Vitamin D_2):					
Quantity	Million U.S.P. units.	2,964,125*	2,593,642*	2,213,278	1,743,155
Value	....	n.a.	n.a.	n.a.	n.a.
Niacin and niacinamide:					
Quantity	Lb.	76,755*	82,810	95,183	98,922
Value	....	n.a.	n.a.	n.a.	n.a.
Pyridoxine (B_6):					
Quantity	Lb.	757	1,120	1,151	1,136
Value	....	n.a.	n.a.	n.a.	n.a.
Riboflavin for human consumption:					
Quantity	Lb.	....	....	....	....
Value	....	n.a.	n.a.	n.a.	....
Thiamin chloride (B_1):					
Quantity	Lb.	16,860	15,056	16,344	14,958
Value	....	n.a.	n.a.	n.a.	n.a.
All other vitamins[11]					
Quantity	Lb.	n.a.	n.a.	n.a.	n.a.
Value	....	n.a.	n.a.	n.a.	n.a

[1] Reported on the basis of 100 percent content of the specified material unless otherwise indicated.
[2] Natural acetic acid (produced by direct process from wood) and acetic acid distilled from calcium acetate as reported to the U. S. Bureau of the Census.
[3] Produced from ketene, acetylene, ethylene, and from acetic acid by the vapor phase process.
[4] Statistics are given in terms of bulk medicinals only.
[5] Produced by tar distillers from purchased coal tar only or from oil-gas or water-gas tar produced or purchased by tar distillers.
[6] Product of byproduct coke-oven operators only. These statistics are collected and compiled by the Coal Economics Division, U. S. Bureau of Mines.
[7] Statistics represent total production, from all sources including both data reported by coke-oven operators to the Coal Economics Division, Bureau of Mines and that reported by distillers of purchased coal tar to the U. S. Tariff Commission.
[8] Includes refined cresylic acid derived from petroleum.
[9] Reported to the U. S. Bureau of the Census.
[10] Includes toluene produced from petroleum by any process.
[11] Includes panthothenic acid and salts, riboflavin for animal use, irradiated animal sterols, menadiones and other vitamins for which statistics are not shown.

Note—n.a. signifies information is not available. A dash (....) indicates either the statistics are confidential because publication would reveal operations of individual companies, or the data which had been received at the time of publication of this report were not indicative of total production. * Revised.

January-November 1946 cumulative imports amounted to 1,262,000 short tons, valued at $35,769,000. Compared with the previous year, this was 20 per cent less by weight and 12 per cent less by value than imports for January-November.

Imports for the first five months of the fiscal year totaled 455,000 short tons with a value of $13,909,000. This was 1 per cent less than the tonnage reported for the same period in 1945 but the value was 5 per cent greater. July-November 1946 imports were 7 per cent greater by weight and 23 per cent greater by value than for the corresponding period of 1944.

Lead Production At Low Ebb

Preliminary estimates of mine production in the United States and Alaska in 1946 indicate an output of 332,478 tons of recoverable lead, a decrease of 15 per cent from 1945.

Preliminary data based on reports from producers covering eleven months' actual output plus an estimate for December indicate that 355,600 short tons of refined lead and 51,100 tons of antimonial lead were produced at primary refineries in 1946.

Total output of refined lead dropped 23 per cent and antimonial lead production fell 10 per cent compared with the 1945 outputs. It is estimated from incomplete data that 303,000 tons were produced from domestic ores and base bullion, an indicated decline of 15 per cent, and the smallest output since 1934.

The antimonial lead produced in 1946 dropped 10 per cent from 1945 and the antimony content declined to 5.9 per cent. Although sufficient data to explain the decline in antimony content are not available, the compilation of final statistics on consumption will likely indicate that greater quantities of low-percentage alloys were used in such items as type metal, cable covering, sheet and pipe, and collapsible tubes and foil.

French Sulfuric Output Gains

Production of sulfuric acid in France, amounting to 163,342 metric tons in the first quarter of 1946, increased to 214,587 tons in the second quarter, according to the French Ministry of Production. Only July and August figures are available in the third quarter, output in those two months totaling 147,298 tons.

Compared with a monthly average in 1938 of 106,000 tons, the monthly average in the first and second quarters of 1946 was 54,447 and 71,529 tons, respectively; in the third quarter (July and August only), it was 73,649.

Mineral Output for 1946

The rather numerous interruptions in nonferrous smelter operations in 1946 decreased the recovery of byproduct cadmium, bismuth, and arsenic about 25, 35, and 50 per cent, respectively, compared with 1945. Mercury output was down 25 per cent and antimony more than 50 per cent. Production of ilmenite lagged 10 per cent but remained at a sufficiently high level to contribute significantly to a peak consumption in titanium pigments. Rutile output held close to the preceding year's level and thereby equalled consumption for the first time since demand for it has been of consequential quantity. Zircon production in 1946 tripled the 1945 output and established a new high.

Chemical Raw Materials.—As an aftermath of war, the agricultural, household, chemical and, especially, the metallurgical demands for common salt showed a downward trend; the value of production of nearly $45,000,000 was about 3 per cent lower than in 1945. Fertilizer demands for sulfur were high, but some of the industrial demands declined; the sales value of about $61,000,000 was virtually the same as the all-time high of 1945. Pyrite sales also were about the same as in 1945. Chiefly as a result of the increasing demands for barite as a weighting material in oil-well drilling muds, the industry attained an all-time high output of about 700,000 tons valued at $5,600,000.

FATS AND OILS
November, 1946

(In thousands of pounds)

Item	Production Nov. 1946	Factory Consumption Nov. 1946
Vegetable Oils		
Cottonseed, crude	164,961	147,393
Cottonseed, refined	138,120	129,160
Peanut, crude[1]	13,110	15,104
Peanut, refined	13,940	7,370
Coconut, crude	18,827	38,577
Coconut, refined	16,305	17,236
Corn, crude	20,331	21,346
Corn, refined	19,487	2,929
Soybean, crude	134,303	129,289
Soybean, refined	120,031	106,744
Olive, edible	[3]	25
Olive, inedible	.....	23
Olive, sulphur oil or olive foots	.....	38
Palm kernel, crude	.....	1,345
Palm kernel, refined	.....	[3]
Palm, crude	.....	3,440
Palm, refined	.....	330
Babassu, crude	[3]	2,063
Babassu, refined	1,355	1,111
Rapeseed	.....	679
Linseed	44,712	42,302
China wood or tung	[3]	2,617
Perilla	.....	3
Castor No. 1, crude	6,289	4,776
Castor No. 3, crude	1,709	1,248
Castor, dehydrated	2,065	1,738
Castor, sulphonated	.....	140
Sesame	.....	4
Oiticica	.....	1,917
All other	2,387	2,147
Animal Fats		
Lard, rendered, including neutral lard and rendered pork fat	177,792	3,010
Tallow, edible	7,510	4,540
Tallow, inedible	75,532	89,687
Neat's-foot oil	142	240
Fish and Marine Mammal Oils[2]		
Cod	548	847
Cod liver	.....	1,506
Other liver	307	502
Other fish	9,957	15,559
Marine mammal	.....	562
Greases		
Greases (including garbage and house), other than wool	44,272	37,633
Wool grease	1,728	1,658
Secondary Products		
Stearin, vegetable oil, winter	8,381	6,627
Stearin, animal, edible	2,819	1,288
Stearin, animal, inedible	3,054	1,375
Oleo oil	4,730	785
Grease oil and lard oil	3,913	3,010
Tallow oil	2,033	919
Vegetable oil foots, raw and acidulated soap stock (100% fatty acid content)	19,569	14,888
Foots from fish and marine mammal oil (100% basis)	[3]	388
Animal foots (100% basis)	2,013	2,961
Other fatty acid stock including spent and salvaged oils and fats, tall oil, palm oil, refuse, etc.	15,503	11,188
Vegetable oil fatty acids from foots and other than from foots including fatty acids from tall oil, palm oil, refuse, etc.	15,841	13,332
Fish and marine mammal fatty acids	2,729	585
Animal fat and oil fatty acids	18,395	18,220
Red oil or oleic acid	6,724	5,033
Stearic acid	4,891	4,646
Other Products		
Glycerin, crude (100% basis)	11,896	11,890
Glycerin, high gravity and yellow distilled (100% basis)	5,832	5,244
Glycerin, chemically pure (100% basis)	5,126	5,263
Hydrogenated oils, edible	98,147	95,784
Hydrogenated oils, inedible	16,337	15,128
Shortening	157,006	747
Winterized vegetable oils	32,538	xxx

[1] Data on production collected by Bureau of Agricultural Economics; stocks held by crude peanut oil producers also reported by Bureau of Agricultural Economics, whereas those held at refineries are collected by the Bureau of the Census.
[2] Included in "All other" vegetable oils to avoid disclosures of operation of individual establishments.
[3] Fish and Wildlife Service collected the data from fish oil producers.
[4] Includes 2,913,000 pounds of menhaden oil and 6,628,000 pounds of herring, sardine and pilchard.
[5] Not shown to avoid disclosure of individual operations.
Source: Bureau of the Census

The output of boron minerals stimulated by requirements of enamels for stoves and refrigerators attained a new high record of 375,000 tons.

The demand for bromine, which is used chiefly as ethylene dibromide—a constituent of anti-knock gasoline—was lower than in 1945 when military demands were still strong. As peace-time demands for lithium salts are only a fraction of those during war, their output declined further from the low level of 1945. Strontium minerals, which are used to some extent as mud-weighting agents in oil-well drilling, but are less effective than barite, dropped to about one-half of 1945 output. There was little change in the market for calcium chloride, used chiefly in stabilizing rural road surfaces.

Other Minerals.—Inability of the domestic mica industry to compete on a cost basis with that of India resulted in a further decline in domestic output in 1946 from the low level of 1945. The value of sales of sheet mica from United States mines was about half a million dollars in 1946. Sales of scrap mica declined slightly. As foreign graphite is available for crucible use, domestic sales were confined chiefly to the amorphous type. Demands were somewhat lower than in 1945.

Substantial gains in glass and enamel manufacture so increased the demand for feldspar that output was more than 400,000 tons in 1946, exceeding all previous records. Sales of talc, which is used principally in the paint, rubber, ceramics, and roofing industries, experienced little change. There was in 1946 an unusually heavy demand for asbestos, and domestic production, which is always small, made substantial gains.

Zinc Scrap Consumption Gains

Zinc scrap consumption, which had risen to a record high in October increased again in November, this time to 19,593 short tons, according to the Bureau of Mines, United States Department of the Interior. The ending of price controls on November 10 had little effect on the flow of zinc scrap to consumers. Although scrap prices increased and the price of Prime Western slab zinc rose quickly after decontrol to 10.50 cents per pound at St. Louis, consumers' receipts of scrap remained at the October level.

Record Year for Superphosphate

A new all-time high in the production of superphosphate (basis 18 per cent A. P. A.) was reached in 1946. Production in 1946 was 0.9 per cent greater than in 1945; although the increase was slight, it must be remembered that production in 1945 was much higher than in any previous year. Shipments of superphosphate during 1946, however, were not as great as in 1945, amounting to 96.3 per cent of 1945 shipments.

In December 1946 production of superphosphate (basis 18 per cent A. P. A.), amounting to 511,000 equivalent tons, was 15 per cent greater than during December 1945. Shipments during December 1946 were 9.4 per cent greater than during December 1945.

Total superphosphate used in mixed goods during 1946 amounted to 2,635,000 equivalent tons, an increase of 15 per cent over the corresponding figures for 1945. Total superphosphate disposed of in 1946 was 4 per cent greater than in 1945. Stocks at the end of December 1946, however, were considerably less than at the end of 1945.

PAINT, VARNISH, LACQUER, AND FILLER

November 1946

Item	*November 1946*	*October 1946*
Total sales reported by 680 establishments	$70,123,613	$69,991,323
Classified sales reported by 580 establishments:		
Trade sales of paint, varnish and lacquer	$35,104,201	$34,936,858
Industrial sales, total	$27,361,186	$28,218,677
Paint and varnish	20,112,693	20,795,577
Lacquer	7,248,493	7,423,100
Unclassified sales reported by 100 establishments	$7,658,226	$6,835,788

PLASTICS AND SYNTHETIC RESINS

December 1946

Item	*Shipments and Consumption (In pounds)* *December 1946*	*November 1946*
Cellulose acetate and mixed ester plastics:[1]		
Sheets:		
Continuous (under .003 gauge)	670,574	343,504
Continuous (.003 gauge and upward)	652,588	577,670
All other sheets, rods and tubes	367,587	151,933
Molding and extrusion materials	7,951,474	5,983,888
Nitrocellulose plastics:[1]		
Sheets	937,160	738,816
Rods and tubes	569,276	494,605
Other cellulose plastics[2]	922,608	809,883
Phenolic and other tar acid resins:		
Laminating (dry basis)	3,120,980	1,957,020
Adhesives (dry basis)	1,614,113	1,389,064
Molding materials[1]	10,579,844[3]	8,770,827
All other, including casting (dry basis)[4]	5,185,017[3]	4,585,620*
Urea and melamine resins:		
Adhesives (dry basis)	3,911,830	3,869,496
Textile and paper treating (dry basis)	976,008	1,357,622
All other, including laminating (dry basis)[4 5]	880,266	829,377
Polystyrene[6]	8,091,951	7,215,827
Vinyl resins:		
Sheeting and film[1]	1,828,122	892,822
Textile and paper coating resins (resin content)	2,874,370	3,660,056
Molding and extrusion materials (resin content)	6,243,440	5,693,090
All other, including adhesives (resin content)[4]	3,260,779	3,209,380
Miscellaneous plastics and resins:		
Molding materials[1 7]	4,666,059	5,253,650
All other (dry basis)[4 8]	2,752,309	3,035,362

* Revised.

[1] Includes fillers, plasticizers and extenders.

[2] Includes methyl and ethyl cellulose and related plastics. This information represents a combination of molding and extrusion materials (statistics previously included with miscellaneous molding materials) and methyl and ethyl cellulose sheets, rods and tubes (statistics previously not published). For comparable figures for January-June 1946, see footnote 2 in August Facts for Industry," Series M19H-86.

[3] Includes operations for two companies not previously reporting; however, this does not appreciably affect the comparability with previous months.

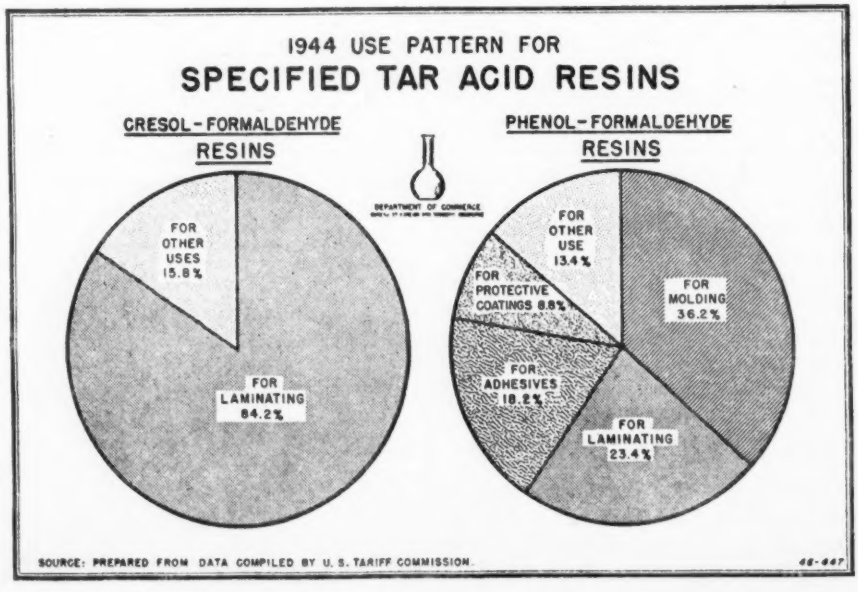
[4] Excludes data for protective coating resins.

[5] Urea and melamine molding materials included with miscellaneous molding materials.

[6] Dry basis, including necessary coloring material.

[7] Includes data for urea and melamine, acrylic acid and miscellaneous molding materials. See footnote 9, Series M19H-86.

[8] Includes data for petroleum resins, acrylic acid ester resins, mixtures and miscellaneous synthetic materials.



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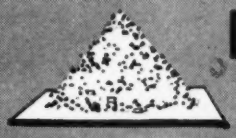

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MARKET OUTLOOK

No Immediate Easing Of Rosin Supply

Paintmakers Face Raw Material Shortages

Dearth of Tin To Continue

Increased Rayon Output Scheduled

Domestic Mercury Production Jeopardized

●

Export Demand Supports Rosin Prices

Not since shortly after World War I has the rosin market been so turbulent as has been the case within the past few weeks. As soon as restrictions were removed on the export of both gum and wood rosin the market was swamped by enormous demands from overseas, with prices soaring above the ten dollar level.

The needs of foreign countries—which normally consume a full half of U.S. rosin output—are real and substantial, and price is almost secondary to delivery. It has been this factor, more than any other, which has boosted rosin prices. But not to be discounted are the efforts of domestic consumers to cover up on future needs.

Basically inquiries have not been limited to any particular grades—and requisitions have run the gamut from G. to WW. Orders have flowed in for all types of rosin—for carlots and less than carload quantities. Turpentine, however, has not shared in the upswing. Many inquiries have been received but few orders have been placed and marketers feel that high prices have acted as a major deterrent. Nor are they unaware of the inroads which petroleum solvents have made in paint formulations.

Whether the rosin shortage and high prices will continue for long is a moot question, but the consensus is that prices will hold up fairly well at least through June. It is possible that they may remain at a fairly high level much longer, but the odds are that they will shade somewhat. Too, it is likely that they will dip sharply when they do.

It is anticipated that April will see more rosin produced, but forward sales are expected to be heavy. This is likely to be so particularly in the case of the more stable wood rosin—for it does not fluctuate nearly as widely as gum rosin.

It is probable that rosin output will gain materially in the next few months, but one limiting factor is the availability of labor in the South. The odds are that output will not meet demand for some little time to come.

And it is equally unlikely that producers will carry heavy inventories—while quotations are high—so that there well may be a good many delivery delays.

Free Tin Market Long Way Off

Few shortages have been more acute than that which has obtained in the case of tin. And last year, according to preliminary estimates, world output totalled 94,000 metric tons. Consumption during the year stood at 125,000 tons.

Current estimates place the actual world needs of tin at about 200,000 tons per annum, but it is not anticipated that production will reach this level until some time in 1949. In the meantime, although it is expected that increasing quantities will become available, it is obvious that a free market will not exist for some time.

The U. S. consumed 42,000 tons; Great Britain, 18,000 tons, and other countries 25,000 tons in the first nine months of the year. Total 1946 consumption was estimated at 60,000, 25,000 and 40,000 tons respectively.

Production estimates for the year, broken down by countries, are: Burma, 300 tons; China, 2000; Malaya, 9000; Siam, 1700; Netherland Indies, 7000; South America, 41,500; Africa, 26,500; and other countries, 6000.

Boom in Rayon Output Predicted

Domestic rayon yarn and staple producers will have increased their capacity of output well over 1.1 billion pounds annually by the end of 1948, amounting to a 28 per cent increase over present figures, according to a survey completed recently by the Textile Economics Bureau Inc.

By the fourth quarter of next year it is expected that rayon output will attain that level, compared with the present operating capacity of 891 million pounds.

It is anticipated that acetate staple will show the largest percentage increase in the ensuing two years. The present capacity of 42 million pounds will be almost tripled to an estimated 123 million pounds. Viscose staple production is scheduled to rise from 139 million pounds to 177 million pounds. Acetate yarn output will show a 41 per cent gain over current levels to a total of 277 million pounds.

Annual output of all viscose-plus-cupra yarn, will go to 543 million pounds, to represent a gain of 6 per cent. High tenacity yarn is expected to be boosted to 250 million pounds.

Paintmakers Face Stringent Period

Measured in dollar volume output of protective coatings gained a full 20 per cent last year over that of 1945, and even allowing for price increases the gain stood at 18.4 per cent. Nevertheless, few industries have been so bedevilled by raw material shortages, and according to present indications the supply situation on a number of paint components will not ease materially during the year. The demand for many of these raw materials appears to be well nigh insatiable.

In the pigments category, for instance, few items have been more difficult to obtain than titanium oxide, and although new plants are being built it is improbable that any real easing in supply will be realized until late in this year. Zinc oxide and lithopone are also on the tight list, and the outlook for any change during the next six months is far from bright. Both these pigments are, of course, affected by the titania shortage, for a supply deficiency in any one white pigment means a heavier demand for the others.

There is little prospect of sufficient immediate improvement in the production of dry colors to effect a major easing in supplies, and lead derivatives, particularly, are destined to remain short. For both lead, and many processing chemicals are on the stringent list. Similarly, many organics have been hit by coal tar shortages.

Mercury Imports Dim Production Outlook

With reports circulating to the effect that some 70,000 flasks of mercury are held in Germany, and a total of about 20,000 flasks in Japan, U. S. producers are keepng a close eye on developments. These reports, in themselves, were disturbing enough to some of the operators of high-cost properties, but the announcement by the Reconstruction Finance Corp. that it planned to import some 2,900 flasks from Japan has caused further speculation.

As it is the few domestic mines which have been able to continue operations since prices dropped, and war demand disappeared, have had a difficult time. Last fall U.S. miners endeavored to prevent the importation of war residues from Belgium. But these efforts were not successful, and the odds are against a more favorable outcome of the present circumstance.

With imports increasing, from Spain, Italy, Mexico and China, the prospects are not encouraging.

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Benzol	Bardol* (Rubber Compounding Oil)
Toluol	Hydrogenated Coal-Tar Chemicals
Xylol	Flotation Agents
Naphthalene	Anhydrous Ammonia
Hi-Flash Solvent	Ammonia Liquor
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Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
February, 1945, $0.874 *February, 1946, $0.859*
February, 1947, $0.648

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Acetaldehyde, 99%, drs.wks..lb.	.11	.15	.11	.15	.11	.14
Acetic Anhydride, drs.....lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv.....lb.	.07	.10	....	.10	.06	.07
ACIDS						
Acetic, 28% bbls.....100 lbs.	3.78	4.03	3.38	4.03	3.38	3.63
Glacial, bbls.....100 lbs.	10.65	10.90	9.15	10.90	9.15	9.40
dms, wks.....100 lbs.	13.20	13.75	6.93	13.75	6.93	7.25
Acetylsalicylic, Standard USP.....lb.	.45	.59	.45	.59	.40	.59
Benzoic, tech, bbls.....lb.	.43	.47	.43	.47	.43	.47
USP, bbls., 4,000 lbs. up..lb.	....	.54	....	.54	....	.54
Boric tech, bbls, c-l.....tons *a*	....	137.50	....	137.50	....	109.00
Chlorosulfonic, drs, wks.....lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls.....lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs, wks, frt, equal.....gal.	1.01	1.04	1.01	1.04	.81	1.04
Formic, 85%-90% cbys.....lb.	.12	.14½	.10	.14½	.10	.13
Hydrofluoric, 30% rubber, dms, ...lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls, wks..lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls, wks.....lb.	.073	.075	.073	.0755	.073	.0755
Maleic, Anhydride, drs.....lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys.....100 lbs.	1.50	2.90	1.50	2.90	1.50	2.45
20° cbys, c-l, wks....100 lbs.	....	2.00	....	2.00	....	1.75
220° cbys, c-l, wks...100 lbs.	....	2.50	....	2.50	....	6.00
Nitric, 36°, cbys, wks..100 lbs. *c*	5.00	6.30	5.00	6.30	5.00	5.25
38°, c-l, cbys, wks...100 lbs. *c*	....	5.50	....	5.50	....	5.50
40°, c-l, cbys, wks...100 lbs. *c*	....	6.50	....	6.50	....	6.00
42°, c-l, cbys, wks...100 lbs. *c*	....	7.00	....	7.00	....	6.50
Oxalic, bbls, wks.....lb.	.13	.14	.11¾	.14	.11¼	.14½
Phosphoric, 100 lb. cbys, USP.....lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls.....lb.	.26	.42	.26	.42	.26	.42
Sulfuric, 60°, tks, wks.....ton	....	13.50	....	13.50	....	13.00
66°, tks, wks.....ton	....	17.50	....	17.50	....	16.50
Fuming 20% tks, wks....ton	....	20.50	....	20.50	....	19.50
Tartaric, USP, bbls.....lb.	.54½	.55	.54½	.55	.54½	.71
Alcohol, Amyl (from Pentane) tks, delv.....lb.	....	.151	....	.151	....	.131
Butyl, normal, syn, tks...lb.	....	.14½	....	.14½	....	.14½
Denatured, DC 14, c-l drs.....gal. *d*	....	.89½	....	.89½	....	.90
Denatured, SD, No. 1, tks. *d*	....	.82½	....	.82½	....	.82½
Ethyl, 190 proof tks.....gal.	....	17.94	....	17.94	....	17.94
Isobutyl, ref'd, drs.....lb.	....	.0860	....	.0860	....	.0860
Isopropyl ref'd, 91%, dms.....gal.	.41	.47½	.44	.47½	.38	.47
Alum, ammonia, lump, bbls, wks.....100 lbs.	....	4.25	....	4.25	....	4.25
Aluminum, 98.99%....100 lbs.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd, l.c.l. wks..lb.	....	.10¼	....	.10¼	.09	.12
Hydrate, light, bgs.....lb.	....	.14½	....	.14½	....	.14½
Sulfate, com'l. bgs, wks, c-l.....100 lbs.	1.15	1.30	1.15	1.30	1.15	1.25
Sulfate, iron-free, bgs, wks .....100 lbs.	1.75	2.00	1.75	2.00	1.75	2.00
Ammonia anyhd, cyl.....lb.	....	.14½	....	.14½	....	.14½
Ammonia, anhyd, tert, tank cars, wks, frt. equalized...ton	....	59.00	....	59.00	....	59.00
Ammonium Carbonate, USP, lumps, dms.....lb.	.08¼	.09½	.08¼	.09½	.08¼	.09½
Chloride, whi, bbls, wks, 100lbs.	4.75	5.00	4.45	5.15	4.45	5.15
Nitrate, tech, bgs, wks....lb.	.0435	.0450	.0435	.0450	.0435	.0850
Oxalate pure, grn, bbls....lb.	....	.23	....	.23	....	.23
Perchlorate, kgs.....lb.	no stocks		no stocks		no stocks	
Phosphate, dibasic tech, bgs.....lb.	.07	.07¾	.07	.07¾	.07	.07¾
Stearate, anyhd, dms.....lb.	....	.34	....	.34	....	.34
Sulfate, dms, bulk.....ton	....	30.00	....	30.00	28.20	30.00
Amyl Acetate (from pentane) tks, delv.....lb.	....	21.0	....	21.0	....	.181
Aniline, Oil, drs.....lb.	.12	.13	.12	.13	.11½	.13
Anthraquinone, sub, bbls....lb.	....	.70	....	.70	....	.70
Antimony Oxide, bgs.....lb.	.23	.26	.21	.26	.15	.21¾
Arsenic, whi, bbls, powd....lb.	.06	.08	.05	.08	.04	.05¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices. *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher; *c* Yellow grades 25c per 100 lbs. less in each case; *d* Prices given are Eastern schedule.

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Barium Carbonate precip, wks, bgs....ton	67.50	82.00	60.00	82.00	60.00	75.00
Chloride, tech, cyst, bgs, zone 1....ton	80.00	90.00	73.00	95.00	73.00	78.00
Barytes, floated, paper bgs..ton	....	41.95	....	41.95	....	41.95
Bauxite, bulk mines....ton	8.50	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms.lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd....gal.	....	.17	....	.17	....	.17
Benzyl Chloride, cbys....lb.	.20	.21	.20	.21	.20	.24
Beta-Naphthol, tech, bbls, wks....lb.	.23	.25	.21	.25	.21	.24
Bismuth metal, ton lots....lb.	....	1.80	....	1.80	1.25	1.80
Blanc Fixe, 66⅔% Pulp, bbls, wks....ton *h*	55.00	60.00	40.00	60.00	40.00	46.50
Bleaching Powder, wks. 100 lbs.	2.75	3.75	2.50	3.75	2.50	3.60
Borax, tech, c-l, bgs....ton *i*	48.50	51.00	45.00	51.00	....	45.00
Bordeaux Mixture, bgs....lb.	.15	.23	.11	.23	.11	.11½
Bromine, cases....lb.	.21	.23	.21	.23	.21	.23
Butyl, acetate, norm. drs....lb.	.26½	.27	.26	.27	.1860	.26½
Cadmium Metal....lb.	....	1.55	....	1.55	.90	1.55
Calcium, Acetate, bgs..100 lbs.	3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs....ton	50.00	90.00	50.00	90.00	50.00	90.00
Carbonate, c-l bgs....ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs, c-l...ton	21.50	38.00	18.50	38.00	18.50	38.00
Solid, 73-75% drs, c-l....ton	21.00	37.50	18.00	37.50	18.00	37.50
Cy'n'd, min. 21% N, c.l..lb.	.02¼	.02¾	.02¼	.02¾	....	....
Gluconate, USP, drs....lb.	.58	.65	.57	.65	.57	.59
Phosphate, tri, bbls, c-l...lb.	....	.0635	....	.0635	....	.0635
Camphor, USP, gran, powd, bbls....lb.	.81	.82	.81	.82	.69	.82
Carbon Bisulfide, 55-gal. drs..lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl....lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms....lb.	.06	.06½	.06	.06½	.69	.80
Casein, Acid Precip, bgs, 10,000 lbs. or more....lb.	no prices		no prices		.24	.33
Chlorine, cyls, lcl, wks, contract....lb.	....	.07¼	....	.07¼	....	.07¼
cyls, c-l, contract....lb. *j*	....	.05¼	....	.05¼	....	.05¼
Liq. tk, wks, contract..100 lbs.	....	2.30	....	2.30	....	2.30
Chloroform, tech, drs....lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude....bbl.	8.25	9.50	8.25	9.50	8.25	9.00
Cobalt, Acetate, bbl....lb.	....	.83¾	....	.83¾	....	.83¾
Oxide, black kgs....lb.	....	1.84	....	1.84	....	1.84
Copper, metal....100 lbs.	....	19.50	....	19.50	12.00	14.75
Carbonate, 52-54%, bbls..lb.	.23	.24	.19½	.24	.19½	.20½
Sulfate, bgs, wks cryst. ....100 lbs.	7.10	8.10	7.10	8.10	5.00	7.25
Copperas, bulk, c-l, wks....ton	....	14.00	....	14.00	....	14.00
Cresol, USP, drs....lbs.	.13¾	.14¼	.13¾	.14¼	.10¾	.14¼
Dibutylamine, c-l, drs, wks..lb.	....	.76	....	.76	....	.68
Dibutylphthalate, drs....lb.	.29½	.30	.29	.30	.17	.29½
Diethylaniline, drs....lb.	....	.48	....	.48	....	.48
Diethyleneglycol, drs, wks...lb.	.14	.15	.14	.15	.14	.15
Dimethylaniline, dms, cl., lcl.lb.	.20	.22	.20	.22	.21	.22
Dimethylphthalate, drs....lb.	.20	.20½	.20	.20½	.20	.20½
Dinitrobenze,e bbls....lb.	....	.16	....	.16	....	.18
Dinitrochlorobenzene, dms...lb.	....	.14	....	.14	....	.14
Dinitrophenol, bbls....lb.	....	.22	....	.22	....	.22
Dinitro.oluene, dms....lb.	....	.18	....	.18	....	.18
Diphenyl, bbls, lcl, wks....lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls....lb.	....	.25	....	.25	....	.25
Diphenylguanidine, drs....lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, syn. 85-90% tks, frt. all'd....lb.	....	.09½	....	.09½	....	.09½
Chloride, USP, bbls....lb.	.20	.22	.18	.22	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms....lb.	.0891	.0941	.0891	.0941	.0842	.0941
Gylcol, dms, cl....lb.	....	.10	....	.10	....	.10
Fluorspar, No. 1, grd. 95-98% bulk, cl-mines....ton	....	37.00	....	37.00	....	37.00
Formaldehyde, bbls, cl & lcl..lb.	.0595	.0645	.0520	.0645	.0520	.0570
Furfural tech, dms, c-l, wks..lb.	....	.13	....	.13	....	.13
Fusel Oil, ref'd, dms, dlvd...lb.	.26	.26½	.18½	.26½	.18½	.19½
Glauber's Salt, Cryst, c-l, bgs, bbls, wks....100 lbs.	1.25	1.75	1.05	1.75	1.05	1.45
Glycerine dynamite, dms, c-l, lb.	.55¼	.75¾	.55¼	.75¾	.17½	.55¼
Crude Saponification, 88% to refiners tks....lbs.	.45	.60	.45	.60	....	.60

GUMS

Gum Arabic, amber sorts bgs ....lb.	.14½	.15	.13¾	.15	.11¾	.14½
Benzoin, Sumatra, cs....lb.	.90⅜	41.00	.90	1.00	.52	1.70
Copal, Congo....lb.	no prices		.... no stocks			.55¾
Copal, East India, chips....lb.	no prices		.... no stocks			.55¾
Macassar dust....lb.	no prices		.... no stocks			.07⅜
Copal Manila....lb.	no prices		.25	....	.13½	.25
Copal Pontianak, bold c-l....lb.	no prices		.... no stocks			.17⅜
Karaya, bbls, bxs, dms....lb.	.21	.50	.21	.50	.18	.50

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

THIOVANIC ACID

(Vacuum Distilled
THIOGLYCOLIC ACID)

Assay 75% (approx.) **HS-CH$_2$-COOH**

Thiovanic Acid, being Vacuum distilled, is a product of superlative purity. No other manufacturer of thioglycolic acid offers better.

You will want to buy Thiovanic Acid for best results and a trouble-free product. Place your order with us today and assure delivery.

★ **SCHEDULE NOW**

$2.20/lb. (100% basis) in carboys

$2.00/lb. (100% basis) 1000 lbs.

monthly on contract

Export inquiries solicited

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Evans Chemetics INC.

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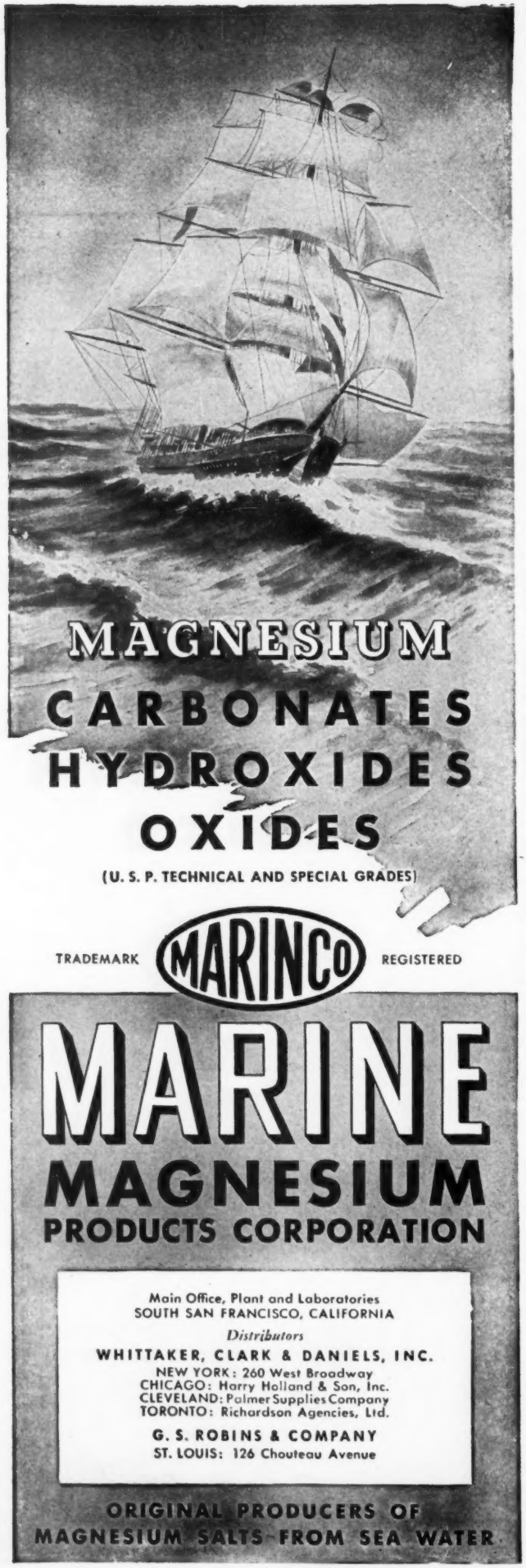
In England, Evans Chemicals, Limited



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Current Prices

Gums
Salt Cake

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Kauri, N. Y.						
Superior Pale XXX ..... lb.	no prices		....	nom.	....	.65½
No. 3 ..... lb.	no prices		....	nom.	....	.22
Sandarac, bgs ..... lb.	.90	.95	.90	.95	.90	.99½
Tragacanth, No. 1, cases .... lb.	4.50	5.00	5.00	5.25	3.75	5.25
No. 3 ..... lb.	3.20	3.45	3.20	3.45	2.10	3.45
Yacca, bgs ..... lb.	no prices		....	nom.	.05	.07¼
Hydrogen Peroxide, cbys .... lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars .... lb.	....	2.10	....	2.10	1.75	2.10
Lead Acetate, cryst, bbls .... lb.	....	.17¾	....	.17¾	....	.16¾
Arsenate basic, bg, lcl ..... lb.	.21	.22	....	.22	.12	.18
Nitrate, bbls ..... lb.	....	.15¾	....	.15¾	....	.12½
Red, dry, 95% Pb_3O_4 bbls ..... lb.	.15½	.17¼	.14¼	.17¼	.09	.16
97% Pb_3O_4, bbls delv ... lb.	.16	.17½	.15	.17½	.09½	.16¾
98% Pb_3O_4, bbls delv ... lb.	.16	.17¾	.15¼	.17¾	.08¾	.17
White, bbls ..... lb.	.14¼	.14¾	.13	.14¾	.07½	.14¼
Basic sulfate, bbls, lcl ... lb.	.13¾	.14	.12½	.14	.07¼	.13¼
Lime, Chem., wks, bulk ..... ton	6.50	10.25	6.50	10.25	6.50	10.25
Hydrated, f.o.b. wks ..... ton	8.50	12.00	8.50	12.00	8.50	12.00
Litharge, coml, delv. bbls .... lb.	.14¼	.16¼	.13	.16¼	.08	.15¼
Lithopone, ordi., bgs ..... lb.	.05½	.06	.05	.06	.04¼	.05¼
Magnesium Carb, tech, wks. lb.	.07¼	.10¾	.07¼	.10¾	.07¼	.10¾
Chloride flake, bbls, wks c-l ..... ton	....	37.00	....	37.00	....	32.00
Manganese, Chloride, Anhyd. bbls ..... lb.	.14	.16	.14	.16	.14	.18
Dioxide, Caucasian bgs, lcl ..... ton	74.75	79.75	74.75	79.75	74.75	79.75
Methanol, pure, nat, drs .. gal. *l*	.63	.73	.63	.73	.63	.73
Synth, drs cl ..... gal. *m*	.31	.38	.31	.38	.24	.38
Methyl Acetate, tech tks .... lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv .. lb.	.09½	.10½	.09½	.10½	.09½	110½
Chloride, cyl ..... lb.	.33	.41	.32	.41	.32	.40
Ethyl Ketone, tks, frt all'd. lb.	....	.09	....	.09	....	.09
Naphtha, Solvent, tks ..... gal.	....	.22	....	.22	....	.27
Naphthalene, crude, 74°, wks. tks ..... lb.	....	.035	....	.035	.0275	.035
Nickel Salt, bbls, NY ..... lb.	.14	.14½	.14	.14½	.13	.14½
Nitre Cake, blk ..... ton	20.00	24.00	....	24.00	....	16.00
Nitrobenzene, drs, wks ..... lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls ..... lb.	....	.70	....	.70	....	.70
Orthochlorophenol, drs ..... lb.	.25	.27	.25	.27	.25	.27
Orthodichlorobenzene, drms. lb.	.07½	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks ..... lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, drms. lb.	.08	.09	.08	.09	....	.09
Paraldehyde, 98%, wks lcl ... lb.	....	.13	....	.13	....	.12
Chlorophenol, drs ..... lb.	.24	.27	.24	.27	.24	.27
Dichlorobenzene, wks ..... lb.	.12½	.14	.12½	.14	.11	.17
Formaldehyde, drs, wks ... lb.	....	.22	....	.22	.21	.22
Nitroaniline, wks, kgs ..... lb.	.41	.43	.41	.43	.41	.45
Nitrochlorobenzene, wks .. lb.	....	.18	....	.18	....	.18
Toluenesulfonamide, bbls .. lb.	....	.70	....	.70	....	.70
Toluidine, bbls, wks ..... lb.	....	.44	....	.44	....	.48
Penicillin, ampules per 100,000 units ..... lb.	....	.21	....	.38	.38	.95
Pentaerythritol, tech ..... lb.	.27	.31	.27	.31	.27	.31

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast ..... gal.	....	.12½	....	.12½	.11½	.12½
Naphtha, East tks, wks ..... gal.	....	.11	....	.11	.11	.12
Rubber solvents, East, tks, wks ..... gal.	....	.12	....	.12	.11	.12
Stoddard Solvents, East, tks, wks ..... gal.	....	.12	....	.12	.10	.12

Phenol, U.S.P., drs ..... lb.	.11¼	.13¼	.11¼	.13¼	.10½	.13¼
Phthalic Anhydride, cl and lcl, wks ..... lb.	.14½	.15½	.14½	.15½	.13	.15½
Potash, Caustics, 88-92%, wks, sol ..... lb.	.06¾	.07½	.06¼	.07½	.06¼	.06¾
Flake, 88-92% ..... lb.	.07½	.08	.07	.08	.07	.07½
liquid, 45% basis, tks ... lb.	....	.03⅜	....	.03⅜	....	.02½
dms, wks ..... lb.	.03¼	.04	.03¼	.04	.03	.03½
Carbonate, hydrated 83-85%, bbls ..... lb.	....	.05¾	....	.05¾	....	.05½
Chlorate crys, kgs, wks ... lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs. lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks ..... lb.	....	.55	....	.55	....	.55
Iodide, dms ..... lb.	1.75	1.78	1.44	1.78	1.44	1.48
Muriatic dom, 60-62-63% K_2O bulk unit-ton ..... ton	....	.53½	....	.53½	.53½	.56½
Permanganate, USP, wks dms ..... lb.	.22½	.23	.20½	.23	.20½	.21
Sulfate, 90%, basis, bgs .. ton	36.25	39.25	36.25	39.25	36.25	39.25
Propane, group 3, tks ..... gal.	....	.03¾	....	.03¾	....	.03¾
Pyridine, ref., drms ..... lb.	.55	.55½	.55	.55½	.45	.55½
R Salt, 250 lb. bbls, wks .... lb.	....	.72	....	.72	....	.65
Resorcinol, tech, drms, wks .. lb.	....	.68	.64	.74	.64	.74
Rochelle Salt, cryst ..... lb.	.34½	.35	.34½	.35	.34½	.47
Salt Cake, dom, blk wks .... ton	20.00	26.00	....	26.00	....	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided into 4 zones, prices varying by zone. Spot price is ½c higher.

	Current Low	Current High	1947 Low	1947 High	1946 Low	1946 High
Saltpeter, grn. bbls.....100 lbs.	8.20	9.00	8.20	9.00	8.20	9.00
Shellac, blchd. bone dry, bbls.....lb.	.71	.74½	.71	.74½	.42½	.74½
Silver Nitrate, bots, 2,500-oz. lots.....oz.	.53¾	.54½	.53¾	.59	.47	.59
Soda Ash, 58% dense, bgs, c-l, wks.....100 lbs.	....	1.28	....	1.28	....	1.28
58% light, bgs cl.....100 lbs.	....	1.20	....	1.20	1.05	1.20
Caustic, 76% flake drms, cl.....100 lbs.	2.90	3.00	2.90	3.00	....	3.00
76% solid, drms, cl. 100 lbs.	2.50	2.75	2.50	2.75	....	2.75
Liquid, 47-49%, sellers, tks.....100 lbs.	....	2.10	....	2.10	....	2.10
Sodium Acetate, anhyd. dms.....lb.	.08½	.10	.08½	.10	.08½	.10
Benzoate, USP dms.....lb.	.46	.52	.46	.52	.46	.52
Bicarb, USP, gran., bgs., cl., works.....100 lbs.	2.25	2.59	2.25	2.59	1.55	2.59
Bichromate, bgs, wks l.c.l..lb.	.08⅜	.08⅞	.07⅞	.08⅞	.07⅞	.08⅛
Bisulfate powd, bbls, wks.....100 lbs.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls., wks.....100 lbs.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l.....lb.	....	.06½	....	.06½	....	.06¼
Cyanide, 96-98%, dms....lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, dms...lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks.....100 lbs.	....	2.25	....	2.25	....	2.25
Metasilicate, gran, bbl, wks c-l.....100 lbs.	....	3.40	....	3.40	....	3.40
Nitrate, imp, bgs.....ton	....	41.50	....	41.50	33.00	38.50
Nitrite, 96-98% bbl. cl....lb.	....	.06¾	....	.06¾	....	.06¾
Phosphate, dianhyd. bgs, wks.....100 lbs.	6.25	7.00	6.00	7.00	6.00	6.75
Tri-bgs, cryst, wks. 100 lbs.	3.50	3.90	2.70	3.90	2.70	3.10
Prussiate, yel. bbls, wks...lb.	....	.12¼	....	.12¼	....	.11
Silicate, 52°, drs, wks...100 lbs.	1.55	2.00	1.40	2.00	1.40	1.80
40°, drs, wks, c-l....100 lbs.	.95	1.15	....	1.15	....	.80
Silicofluoride, bbls, NY...lb.	.07½	.08½	.06½	.08½	.06½	.10
Sulfate tech, Anhyd, bgs.....100 lbs.	1.70	2.20	1.70	2.20	1.70	2.20
Sulfide, cryst c-l, bbls, wks.....100 lbs.	....	2.90	....	2.90	....	2.40
Solid, bbls, wks.....lb.	3.65	4.50	3.15	4.50	3.15	3.90
Starch, Corn, Pearl, bgs. 100 lbs.	4.07	4.22	....	4.321	4.321	6.271
Potato, bgs, cl.....lb.	.07¾	.08½	.0735	.08½	.0735	.0760
Rice, bgs.....lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs.....lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines.....ton	....	16.00	....	16.00	.. .	16.00
Flour, USP, precp, bbls, kgs.....lb.	.18	.36	.18	.36	.18	.36
Roll, bbls.....100 lbs.	2.65	3.40	2.65	3.40	2.40	3.40
Sulfur Dioxide, liquid, cyl...lb.	....	.085	.07	.085	.07	.08
tks, wks.....lb.	....	.044	....	.044	....	.04
Talc, crude, c-l, NY.....ton	....	15.00	....	15.50	....	15.50
Ref'd, c-l, NY.....ton	....	17.50	....	17.50	13.00	21.00
Tin, crystals, bbls, wks.....lb.	no stocks		no stocks		no stocks	
Metal.....lb.	....	.70	....	.70	....	.70
Toluol, drs, wks.....gal.	....	.27	....	.27	.27	.32
tks, frt all'd.....gal.	....	.22	....	.22	.22	.27
Tributyl Phosphate, dms lcl. frt all'd.....lb.	....	.65	....	.65	....	.65
Trichloroethylene, dms, wks.lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks.....lb.	....	.32	....	.32	....	.32
Triethylene glycol, dms.....lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos., bbls.....lb.	.26	.27	.26	.32	.26	.32
Urea, pure, cases.....lb.	....	.12	....	.12	....	.12
Wax, Bayberry, bgs.....lb.	no stocks		no stocks		no stocks	
Bees, bleached, cakes...lb.	.70	.71	.68	.71	.60	.70
Candelilla, bgs, crude.....lb.	.76	.77	.77	.80	.62	.86
Carnauba No. 1, yellow, bgs, ton.....lb.	1.80	1.82	1.90	2.00	1.80	2.04
Xylol, Indus., frt all'd, tks, wks.....gal.	....	.22	....	.22	....	.26
Zinc Chloride tech, fused, wks.....lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer., bgs, wks....lb.	.09	.09¼	.09	.09¼	.07	.09¼
Sulfate, crys, bgs....100 lbs.	4.15	4.90	3.40	4.90	3.40	4.15
OILS AND FATS						
Babassu, tks.....lb.	no prices		no prices		.11	.12
Castor, No. 3, dms, c.l.....lb.	....	.31¼	....	.31¼	....	.29¾
China Wood, drs, spot NY..lb.	.38½	.40½	.39½	.41	.39	.41
Coconut, edible, drs NY....lb.	no prices		no prices		....	.0985
Cod, USP, bbls, dms.....gal.	2.60	3.70	2.60	3.80	2.15	3.80
Corn, crude, tks, wks.....lb.	.30½	nom.	.27	.28½	....	.27
Linseed, Raw, dms, -cl.....lb.	.3660	nom.	.3580	.3660	.1680	.3640
Menhaden, crude tks.....lb.	no prices		.21½	nom.	.1220	.21½
Light, pressed, drs l.c.l....lb.	....	.29	....	.29	.1300	.29
Palm, Niger, dms.....lb.	no prices		no prices		....	.0865
Peanut, crude, tks, f.o.b. wks.lb.	.30½	nom.	.28	.28½	.12½	.28½
Perilla, crude, dms, NY.....lb.	no stocks		no stocks		no stocks	
Rapeseed, bulks.....lb.	.32	nom.	....no prices		....	.13
Red, dms.....lb.	.29¾	.30¾	.29¾	.30¾	.13¾	.30¾
Soy Bean, crude, tks, wks...lb.	....	.27½	.26½	.27½	.1175	.2450
Tallow, acidless, dms.....lb.	....	.27	....	.27	....	.14¼

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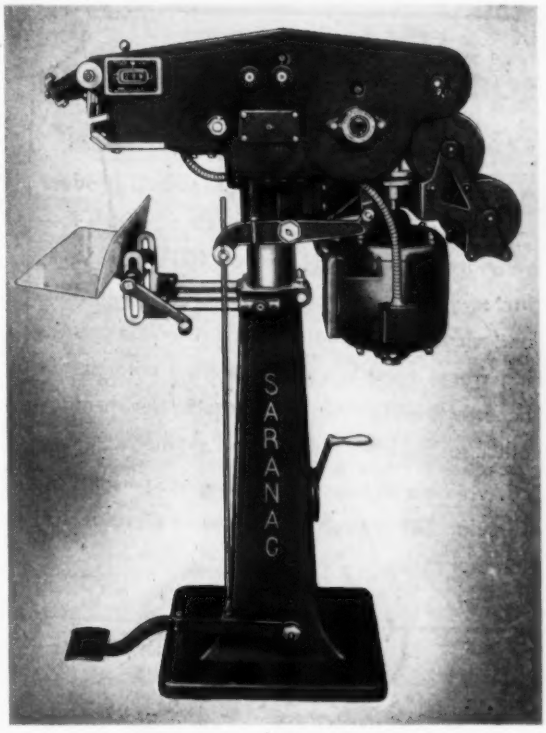

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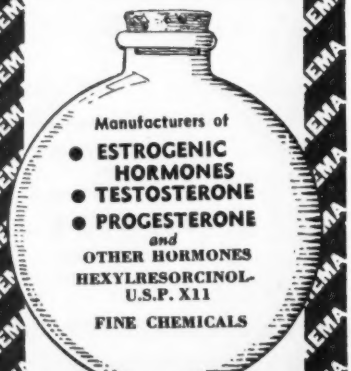

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PATENTS

Labor Relations

(*Continued from page 430*)

cause he told of the action for injunction and damages at Chicago against the union to stop publishing the false accusations, but the court held that this statement of fact "could not be distorted into an ominous threat of criminal liability against the workers." Even the manager's expressed opposition to a closed shop was in effect a threat, according to the arguments of the National Labor Relations Board. However, the court held that there is no mention in the Act in regard to closed shop "except to the effect that nothing in the Act should preclude an employer from making a closed-shop contract with a union."

The Montgomery Ward & Co. decision cited above assures employers the right to give their employees their opinion about unions, provided they stick to facts and honest opinions necessary to combat union propaganda. It does not permit any more genuine coercion than previously. A decision of the United States Circuit Court of Appeals, Sixth Circuit, Cincinnati, Ohio, October 16, 1946, in the C. D. Beck & Co. case, makes that distinction clear. The decision is the more interesting because this is the same court that passed on the famous Ford Motor Co. case (one of the earliest), holding that the employer has the right not only generally to express his labor views, but to distribute to his employees a pamphlet embodying these views.

In the present case the manager of the company told his employees if they joined the union they would be "sticking their necks out," and directed them to return from their union meeting with "a changed mind." These were adjudged "to be an unfair labor practice under the N.L.R.A. and not protected by the free speech provision of the First Amendment to the Federal Constitution, since the reasonable inference from such statements is that the manager intended a threat of discharge of and discrimination against employees."

The court summed up previous decisions on this point thus: "Decisions on the right of freedom of speech of the employer, in making statements disparaging of the union, have always held such statements to be justified only if the expressions in controversy are noncoercive. If they are couched in such phrases, or attended by such circumstances that they tend to exercise undue influence and coercion upon the employees, the expressions of opinion are not protected."

Chlorine Institute Elects

The Chlorine Institute, Inc., has elected the following directors for two year terms: Thomas Coyle, E. I. duPont de Nemours & Co., Inc.; W. I. Galliher, Pittsburgh Plate Glass Co.; E. W. Haley, Southern Alkali Corp.; L. Neuberg, Westvaco Chlorine Products Corp.; E. E. Routh, The Mathieson Alkali Works, Inc.; B. P. Steele, Pennsylvania Salt Manufacturing Co.

At a directors' meeting following the annual meeting, the following officers were elected for the year 1947: S. W. Jacobs, president; E. C. Speiden, vice-president; R. T. Baldwin, secretary and treasurer.

Baekeland Award to Flory

Paul J. Flory, 36-year-old head of fundamental research at the Goodyear Tire and Rubber Company research laboratory, Akron, Ohio, has been chosen as the 1947 recipient of the Leo Hendrik Baekeland Award of the North Jersey Section of the American Chemical Society.

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"WE"— EDITORIALLY SPEAKING

THE CHEMICAL INDUSTRY lives upon facts and exhales neat columns of figures: If you don't believe it, look at the article on the chemical industry of the Southwest in this issue. The good publication *Chemistry & Industry* reminds us of the chemist's preoccupation with statistics and gives us an amusing passage from O'Henry:

"Let us sit on this log at the roadside," says I, "and forget the inhumanity and ribaldry of the poets. It's in the glorious columns of ascertained facts and legalized measures that beauty is found. In this very log we sit upon, Mrs. Sampson," says I, "is statistics more wonderful than any poem. The rings shew it was sixty years old. At the depth of two thousand feet it would become coal in three thousand years. The deepest coal mine in the world is at Killingworth, near Newcastle. A box four feet long, three feet wide and two feet eight inches deep, will hold a ton of coal. If an artery is cut, compress it above the wound. A man's leg contains thirty bones. The Tower of London was burned in 1841." "Go on, Mr. Pratt," says Mrs. Sampson. "Them ideas is so original and soothing. I think statistics are just as lovely as they can be."

IT OCCURS TO US that in all our plenitudinous prolixity we have never quoted Stanislaus, King of Poland. His was the clever and acute observation that "Science when well digested is nothing but good sense and reason."

CHEMISTRY ISN'T ALL it's cracked up to be, according to *The Chemical Age*. There has been a great deal of letter writing to the London *Times*, it reports, concerning the low estate to which the kipper has fallen of late.

It turns out that the kippers were formerly plump, picked herring, which were gutted and hung for the night in the smoke of peat and oak chips. Now they are dyed and dry, a reddish color replacing the soft smoked amber of the happy past.

It seems that Herring Industry Board decided that kippering methods were old-fashioned and urged industry members to produce uniform, more economical kippers by modern methods. "No mention was made . . . however, of the relative merits of smoking and dyeing; what we might refer to as the old-fashioned or natural method as against the synthetic. Although we should, perhaps, by virtue of our calling, prefer the chemically dyed fish, we must confess that our baser instincts still call for the plump, smoked kipper."

THE *Wall Street Journal* will have us believe that it has been prowling around the well-known Jersey swamps, observing the value of DDT against the winged denizens abounding therein:

"It will be no surprise to many to learn that New Jersey mosquitoes are laughing at DDT. Of course, when the scientists developed the material, they had to think in terms of averages, and no normal person will believe that Joisey skeeters are anywhere near average. Some preliminary reports of investigating commissions state sadly that, when DDT was tossed at 'em, the Jersey fliers simply sneezed once or twice and declared the DDT better than mentholatum products for clearing the nasal passages. The chemical that killed bugs, beetles, ants, gnats and fleas in Florida just tickles the Joisey fauna. Some scientists believed the atomic bomb will flatten the superfortress skeeters of Jersey; others say the bomb will just give them a pleasant ride on the breeze."

THE WIFE of one of us (who gives us due credit for omniscience in matters scientific) wants to know why an angora sweater won't shed if it is placed in the icebox for a few hours before wearing. She thinks there must be something chemical about it. We're sure we don't know, but our reputation will take a chilly plunge if we don't dream up something plausible soon. It doesn't have to be true, of course—just plausible.

NOT ALL of our chemical queries come from chemical concerns or chemists. We've told the editor of a story magazine where a fictional character might buy chemicals in New York City; we've assured a movie outfit that their mythical name for a chemical firm was truly mythical; we've set the feet of a life insurance advertising woman on the path of technical rectitude; we are constantly translating "foreign" words like Fer Ricoxide into Ferric Oxide. What really stopped us, though, was the query from a high-school girl, "What book will tell me all about the chemical industry? I have to write a paper within two weeks."

We'd like a copy of that book ourselves. We hope she passed the course.

FIFTEEN YEARS AGO

(From Our Files of March, 1932)

Imperial Chemical Industries, Ltd., announces commercial production of benzyl cellulose, hailed as a new compound for plastics, coatings and synthetic fibers.

American chemical exporters are concerned over the 10 per cent tax on goods entering Great Britain, which took effect the first of the month.

Francis P. Garvan, head of the Chemical Foundation, is made a Knight of the Legion of Honor of the Republic of France. The French ambassador bestowed the decoration at a private dinner.

The estate of the late Dr. William H. Nichols, of Allied Chemical & Dye Corp., has been appraised at $9,137,140 net.

The House Military Committee approves in principle leasing Muscle Shoals to private operators for fertilizer production.

Calco Chemical purchases alkali blue and iridine violet business of Zinsser & Co.

THIRTY YEARS AGO

(From Our Files of March, 1917)

Several pharmaceuticals, including novocaine, salvarsan and antipyrine, will be manufactured for the first time in this country by Farbwerke-Hoechst Co., a New York corporation. The German firm, Farbwerke vormals Meister, Lucius und Bruning, Hoechst-am-Main, will carry out the process here.

Domestic dyestuffs manufacturers fear that their industry will be ruined by the Tariff Commission, composed in the main of men who are opposed to protective tariffs.

Professor John E. Bucher, of Brown University, announces a process for nitrogen fixation which does not require electric power. He would pass air through a mixture of soda ash and coke, in the presence of iron catalyst and at high temperature, to produce cyanide.

The Du Pont Company has bought certain dye processes from Levinstein, Ltd. The report is denied that Du Pont is the American corner of a four-cornered international cartel in dyestuffs.

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Abstracts of U. S. and Foreign Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of U. S. patents are available from the Patent Office at 25 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

Requests for further information or photostated copies of Canadian patents should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

U. S. Patents from Official Gazette—Vol. 592, Nos. 3, 4—Vol. 593, Nos. 1, 2 (November 19—December 10)
Canadian Patents Granted and Published December 31, 1946—January 21, 1947.

*Organic

Preparation of diaryl hydantoin comprises heating together at temperatures above 90° C. for a few hours, permitting accumulation of appreciable reaction product, a diaryl ketone, a water-soluble inorganic cyanide, and a reagent derived from the system NH_3-CO_2-Aq capable of regenerating all of latter components under conditions of reaction, in presence of lower aliphatic amide, acidifying reaction mixture, separating diaryl hydantoin. No. 2,409,755. Henry Henze to Parke, Davis & Co.

Preparation of diaryl hydantoin comprises heating together at temperatures above 50° C. for few hours, permitting accumulation of appreciable reaction product, a diaryl ketone, a water-soluble inorganic cyanide, and a reagent derived from system NH_3-CO_2-Aq capable of regenerating all of latter components under conditions of reaction, in presence of a glycol, acidifying reaction mixture, separating diaryl hydantoin. No. 2,409,756. Henry Henze to Parke, Davis & Co.

Complex salt of naphthenic acid and a dialkyl, monoacid orthophosphate having at least four carbon atoms in each alkyl radical with polyvalent metal selected from lead, manganese, zinc and cobalt. No. 2,409,774. Gerry Mack and Charles Klebsattel to Advance Solvents & Chemical Corp.

Production of monoethylbenzene comprises reacting benzene, ethyl alcohol and ethylene at 500° F. to 750° F. under pressure of from 200 pounds to 1200 pounds per square inch in presence of solid phosphoric acid catalyst in reaction zone. No. 2,409,802. Louis Schmerling to Universal Oil Products Co.

Producing 3 cyano pyridine by heating mixture of potassium cyanide and sodium cyanide with pyridine sulfonic acid salt of formula described in patent. No. 2,409,806. William Shive and Richard Glenn to Pittsburgh Coke & Chemical Co.

Stabilizing addition agent for inhibiting crystallizing tendency of sucrose-rich syrup, comprising, sterile Leuconostoc mesenteroides culture liquor product having solid content of 50% dextran, 36% levulose, 6% dextrose, 2% sucrose and 6% non-sugars. No. 2,409,816. Daniel Wadsworth and Mary Hughes to Refined Syrups & Sugars, Inc.

Condensation product of 2-carboxylic amidothiazole having hydrogen atom on carbon atom in beta position to ring nitrogen atom and at least one mol each of formaldehyde and strongly basic, non-aromatic amine having at least one reactive hydrogen atom on amino nitrogen atom thereof. No. 2,409,828. Louis Bock, Howard Johnson, and Leonard Armstrong to Rohm & Haas Co.

Alkylene bis-ureas having structural formula described in patent. No. 2,409,829. William Boon to Imperial Chemical Industries, Ltd.

Producing aryl-dicyandiamide comprises reacting corresponding aryl-azodicyandiamide with strong mineral acid in liquid medium of water and water-soluble organic liquid. No. 2,409,832. Wallace Broadbent and Francis Rose to Imperial Chemical Industries, Ltd.

Perylene derivatives. No. 2,409,851. Norman Haddock to Imperial Chemical Industries, Ltd.

2-Ethylhexyl fluoroacetate. No. 2,409,859. John Horsfall to American Cyanamid Co.

Composition of matter comprising heat reaction product of ingredients comprising aminotriazine-aldehyde addition product and primary monoamino-diphenyl free from aldehyde-reactive substituents, molecular proportions of amino-diphenyl being at least equal to molecular proportions of aminotriazine but not exceeding molecular proportions of aldehyde used to form addition product. No. 2,409,906. Milton Scott to Monsanto Chemical Co.

Preparation of acidic compositions comprises subjecting material consisting of primary oleoresin acids containing levopimaric acid, in solution in volatile solvent selected from paraffin hydrocarbons and cycloparaffin hydrocarbons, to reaction with maleic anhydride at 0° C. to 80° C., to cause formation of precipitated crystalline maleic anhydride-resin acid adduct, etc. No. 2,409,930. Richard Cox to Hercules Powder Co.

Non-aqueous gel comprising oleaginous material, soap of long chain carboxylic acid in amount to thicken oleaginous material and to convert it into gel, and alkaline earth metal salt of saturated cyclic hydrocarbon carboxylic acid in amount from .001% to 5.0% reducing tendency of gel to bleed. No. 2,409,950. Hughan Meyer, Jr., to Foote Mineral Co.

1-methylolcyclohexyl-cyclohexyl-carbinol, formula described in patent. No. 2,410,007. Joseph Bludworth and Donald Easter to Celanese Corp. of America.

Di-beta-hexahydrobenzyloxyethyl-phthalate. No. 2,410,008. Joseph Bludworth and Donald Easter to Celanese Corp. of America.

Compound selected from basic-alkyl esters of formula described in patent, and acid salts thereof. No. 2,410,040. Frederick Blicke to Regents of the University of Michigan.

Production of diolefinic hydrocarbons by high temperature reaction, improvement comprises contacting hot gaseous reaction products first with water and then with relatively cool liquid comprising fat oil, separating cooled gaseous reaction products from oil, liquefying fraction containing bulk of diolefinic compounds in reaction products, separating uncondensed gases from liquefied fraction, etc. No. 2,410,048. Donald Campbell to Standard Oil Development Co.

Preparing dioleyl ketone from oleic acid comprises heating acid at above 300° C. and below destructive distillation temperature of acid in presence of active metal which reacts with water to produce nascent hydrogen at said temperature and in non-oxidizing atmosphere of substantially only evolved gases with positive pressure produced by said gases. No.

(*Continued on page 534*)

* *Continued from Vol. 591, Nos. 4, 5, Vol. 592, Nos. 1, 2.*

Patents Available for License or Sale

The Patent Office is regularly publishing a Register of Patents Available for Licensing or Sale. Patents concerning chemical products and processes appear below.

January 21, 1947

Pat. 1,948,180. Heavy Fluid Eliminator. Patented Feb. 20, 1934. A device for collecting moisture from air. Consists of a casing with a bottom intake opening and a small discharge passage. A partition which divides the casing into two chambers has a cross-tube projecting therethrough. A large number of fine passages for dividing the circulating fluid are provided. All fluid passing through the casing is divided into fine jets. (Owner) E. C. Jones, c/o Mrs. W. G. Holmes, 415 West 46th Terrace, Kansas City, Mo. Group 33—61. Reg. No. 5,017.

Pat. 2,395,620. Bottle Inspection Device. Patented Feb. 26, 1946. An attachment to facilitate the inspection of filled bottles. Consists of a conveyor, a source of light, and an endless belt. In operation a plurality of presser devices are employed to rotate each bottle successively as it passes in front of the light source. (Co-owners) Walter C. Fogle and George M. Lupton. Address correspondence to Walter C. Fogle, c/o Lynchburg Coca-Cola Bottling Works, Lynchburg, Va. Group 35—62. Reg. No. 5,027.

Pat. 2,404,679. Carbonator. Patented July 23, 1946. A compact carbonator for soda fountain or like use, comprises a two-chambered container having water and gas inlets. As carbonized liquid is drawn off the level of the liquid falls. This causes a float to drop so that more water passes into the chamber. When the float rises to a predetermined level a switch is activated and a solenoid valve allows more gas to enter the chamber. The operation is automatic and a continuous supply is assured as long as the unit remains in operation. (Co-owners) Philip Andron and Harold Krichman. Address correspondence to Harold Krichman, c/o Vendall Sales Company, 127 East 22nd St., Bayonne, N. J. Group 39—97. Reg. No. 5,028.

Pat. 2,296,792. Automatic Air Control. Patented Sept. 22, 1942. Group 33—66. Reg. No. 5,030.

Pat. 2,364,299. Automatic Air Control for Gas Burners. Patented Dec. 5, 1944. Group 33—66. Reg. No. 5,031.

The two patents listed above relate to an automatic air control attachment, for gas burner furnaces and the like, which aids combustion and lowers the gas consumption by automatically admitting more air to the burner for thinning the fuel mixture as atmospheric temperature rises. As temperature rises thermostat expands and gradually opens ports and admits more air from conduit to mixing tube. (Owner) Lynn C. Kester, Hereford, Tex.

January 28, 1947

Pat. 1,890,421. Nonrefillable Receptacle. Patented Dec. 6, 1932. Group 35—69. Reg. No. 5,043.

Pat. 1,972,430. Nonrefillable Container Such as Cans. Patented Sept. 4, 1934. Group 35—69. Reg. No. 5,044.

Pat. 1,988,881. Nonrefillable Receptacle. Patented Jan. 22, 1935. Group 35—69. Reg. No. 5,045.

These three patents relate to a device to be attached to oil drums or cans to prevent refilling. The device has a tubular shell with a spring-closed valve. A baffle prevents the shell from being reopened after it has been closed, thus sealing the device against refilling but permitting liquid to be dispensed in the usual manner. (Co-owners) William B. W. Mann and Frank A. Talbot. Address correspondence to Frank A. Talbot, 2626 North Calvert St., Baltimore, Md.

Pat. 2,405,380. Conjugated Fatty Polyene Compounds. Patented Aug. 6, 1946. Treatment of unsaturated and non-conjugated oils such as linseed, soy-bean, Perilla, sardine and others so that their properties are rendered similar to oils such as Chinawood or oiticica. The process consists of vaporizing liquid compounds of the above oils at temperatures ranging from 200-350° C., in the presence of 2-20% magnesium silicate or other adjuncts until a conjugation of at least 15% but preferably 40-80% is reached. The enamels and varnishes to which the treated oils are added become fast drying, tack-free, form a hard film and are alkali and water resistant. (Co-owners) Amos Turk and Jaul D. Boone, 804 Washington Bldg., Washington, D. C. Group 28—11—20—29. Reg. No. 5,049.

Pat. 2,179,437. Incandescent Lamp. Patented Nov. 7, 1939. An electric lamp comprising two bulbs arranged one within the other. A filament of tungsten hexachloride is sealed within inner

(*Continued on following page*)

bulb, the pressure of which is so adjusted that the rate of condensation on the filament equals the rate of evaporation at a given temperature of the filament. Permits operation of filament at a temperature below its melting point, resulting in a very high lighting efficiency and a much whiter light. (Owner) Arthur R. Socolofsky, 2121 Madison Ave., Toledo 2, Ohio. Group 36—51. Reg. No. 5,056.

Pat. 2,331,487. **Closure Means for Tubes.** Patented Oct. 12, 1943. Hinged cap holder is easily applied to collapsible tubes to prevent loss of the cap by holding it at the side of the tube. A metal plate, which fits the base of the tube neck, has a hingedly connected U-shaped wire, each leg of which is bent to form an elongated loop. The flanges of the cap are engaged by the loops so that the cap is retained. (Owner) James E. McNeal, R. D. 5, Towanda, Pa. Group 34—92. Reg. No. 5,060.

Pat. 2,119,105. **Process for the Purification of Silica.** Patented May 31, 1938. A method for the purification of sand in which free iron is present as an impurity so that the treated sand may be later used in the production of colorless glass. The sand is added to a sulphuric acid solution and heated within a closed vessel from which oxygen has been removed by carbon monoxide or any other reducing agent. The sand is heated until the iron content is less than 0.04%. The sand is later washed with water and a weak alkaline solution to neutralize any trace of acid. (Co-owners) Robert Hutchinson and John Arthur Newbold. Address correspondence to A. J. Stephens, 15 Great James St., London W. C. 1, England. Group 32—29. Reg. No. 5,065.

February 4, 1947

Pat. 1,864,640. **Rotary Compressor and Pump.** Patented June 28, 1932. Working chambers of this compressor or pump are sealed and valve functions obtained without having to resort to rubbing metal-to-metal contact between parts which become worn or require lubrication. Compressing or pumping functions are performed by a rotating body of mercury or any other suitable liquid. (Co-owner) Cameron A. Whitsett. Address correspondence to Brown, Jackson, Boettcher & Dienner, 1550 Monadnock Block, 53 West Jackson Blvd., Chicago 4, Ill. Group 35—61. Reg. No. 5,079.

February 11, 1947

Pat. 2,349,115. **Filter Blank.** Patented May 16, 1944. Funnel-shaped filter made of paper or other material contoured to require less material than a disc. A substantially semi-circular sheet has concaved extension projecting from and beyond straight edge of sheet to form flange. Sheet with flange is folded at center line. Flange is then folded on folded sheet to provide filter, when opened, with closure flap which gradually increases in upward direction. (Owner) John M. Sanford, The Sanford Laboratory, 2206 South 7th St., Terre Haute, Ind. Groups 26—25; 39—11. Reg. No. 5,089.

Pat. 2,000,946. **Apparatus for Dispensing Inflammable Fluids.** Patented May 14, 1935. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) Water displacement type of inflammable fluid stowage using unique pumping arrangement. Fluid pump drawing inflammable fluid from top of the container is driven by water powered turbine or motor from which portion of waste water, equal to quantity of fluid pumped, is discharged into container to displace inflammable fluid. This arrangement reduces positive or negative pressure in container from those used in conventional systems. Inventor states the apparatus has been used extensively for stowage of gasoline on shipboard. (Owner) Clyde M. Hamblin, 1429 Iris St., N. W., Washington 12, D. C. Group 35—61. Reg. No. 5,091.

Pat. 2,173,109. **Process for Welding Pipe Joints.** Patented Sept. 19, 1939. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) This process utilizes non-fusible plugs inserted inside pipe joint to maintain smooth interior surface in pipe at weld. Plugs are removed after weld has been completed and they may be made of magnesia block which will disintegrate in water, or be fragile so that they are easily crushed by a plunger. In welding galvanized pipe thin zinc sleeve is used on plug to galvanize weld. (Owner) Clyde M. Hamblin, 1429 Iris St., N. W., Washington 12, D. C. Groups 35—42; 36—19. Reg. No. 5,094.

Pat. 2,183,561. **Mechanical Foam Generator.** Patented Dec. 19, 1939. (Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757.) Equipment of ejector or eductor type for mixing foaming agent and air or inert gas with water operating ejector or eductor to generate mechanical foam for fighting fires. (Owner) Clyde M. Hamblin, 1429 Iris St., N. W., Washington 12, D. C. Group 35—69. Reg. No. 5,095.

Pat. 2,126,590. **Lubricating Oil.** Patented Aug. 9, 1938. Lubricating composition comprising mineral lubricating oil and halogenated petroleum wax. Wax may be added to oils in different quantities to improve film strength, exact amount depending upon quality and initial film strength of original lubricant and film strength desired in blended product. (Owner) Lubrizol Development Corp., P. O. Box 3057, Euclid Station, Cleveland 17, Ohio. Group 29—11. Reg. No. 5,106.

(*Continued from preceding page*)

2,410,096. Ronald Meyer and Ferdinand Otto to Socony-Vacuum Oil Co., Inc.

Producing trialkyl phosphate comprises heating mixture of from 2 to 6 moles of acid dialkyl phosphate with 1 mole of caustic soda at 100° to 300° C., separating trialkyl phosphate. No. 2,410,118. Willard Woodstock and Paul Pelletier, Jr., to Victor Chemical Works.

Plasticized "prolamine-base" composition of matter comprising alkyl branched-chain organic fatty acid in which total number of carbon atoms in molecule is in range from 4 to 18 inclusive, and "prolamine-base" protein. No. 2,410,124. Willard Morgan, one-half to A. E. Staley Manufacturing Co., and one-half to American-Maize Products Co.

Ester of halogen substituted carboxylic acid and heterocyclic alcohol selected from tetrahydropyrrole alcohol and monomethyloltetrahydropyrrole. No. 2,410,197. Joseph Borglin to Hercules Powder Co.

Production of O-acylated amides comprises reacting fatty acid anhydride with oxazcline of formula described in patent. No. 2,410,318. Philip Tryon to Commercial Solvents Corp.

Purifying steam distilled tetraethyl lead, containing sludge-forming impurities, comprises washing tetraethyl lead with at least 1/5 volume of aqueous solution of hydrogen peroxide containing from 0.35 to 5% of hydrogen peroxide. No. 2,410,356. Alfred Parmelee to E. I. du Pont de Nemours & Co.

Oil-in-water emulsion having, as disperse phase, monoester of glycol having from 2 to 3 carbon atoms with higher fatty acid having 10 to 14 carbon atoms, and continuous phase comprising aqueous solution of film-forming protective colloid, and water-soluble organic carboxylic compound selected from carboxylic acids and their acidic reacting salts. No. 2,410,382. Saul Kaplan to Onyx Oil & Chemical Co.

Isolating arylide of aromatic orthohydroxy carboxylic acid from reaction mixture resulting from reaction of hydroxy acid with aromatic amine in presence of condensing agent, improvement comprises neutralizing any acid present and effecting filtration in presence of inert organic solvet for tarry impurities selected from liquid hydrocarbons of benzene series and liquid chlorinated hydrocarbons, amount of solvent being 25 to 200% by weight of arylide. No. 2,410,397. Robert Weiss, and Andrews Wintringham to American Cyanamid Co.

Preparation of thiophene comprises reacting conjugated diene hydrocarbon in gaseous state with sulfur vapor by contacting hydrocarbon with sulfur vapor at temperature between 445° C. and thermal decomposition temperature of conjugated diene. No. 2,410,401. Donald Coffman to E. I. du Pont de Nemours & Co.

In manufacture of dihydrochloride of 2-methoxy-6-chloro-9-(4'-diethylamino-1'-methyl-butylamino)-acridine, step which comprises heating together, in phenol as solvent, equimolecular proportions of 2-amino-5-diethylaminopentane and 2-methoxy-6-chloro-9-aryloxyacridine in presence of hydrogen chloride between 1.25 and 2.25 equivalents per mole of aminopentane. No. 2,410,406. William Cowdrey and Arthur Murray to Imperial Chemical Industries, Ltd.

Manufacture of carbamide derivatives. No. 2,410,407. John Durland to Monsanto Chemical Co.

New compound, polydihydronorpolycyclopentadienyl ester of polybasic organic carboxylic acid, ester being acid-catalyzed addition-rearrangement product of polybasic carboxylic acid and crystalline polycyclopentadiene having two double bonds and one to four endomethylene cycles per molecule, having each carboxylic ester group attached to terminal cycle from rearranged polycyclopentadiene at secondary carbon atom thereof, oposite terminal cycle thereof being five-membered ring containing one olefinic linkage. No. 2,410,425. Herman Bruson to The Resinous Products & Chemical Co.

Alkyl mercapto substituted amino benzoic acid alkamine amides, salts, intermediates, and process of preparing same. No. 2,410,431. John Donleavy to Allied Laboratories, Inc.

Making dry saponified rosin size comprises saponifying rosin under atmospheric pressure with concentrated aqueous solution of alkali metal carbonate to an extent not more than 80% of theoretical complete saponification, to form concentrated paste size which is free of carbonates, saponifying paste size with concentrated aqueous solution of alkali metal hydroxide in amount to provide neutral saponified rosin size, etc. No. 2,410,433. Arthur Dreshfield to Hercules Powder Co.

Producing diolefin comprises reacting alcohol and aceetylenic hydrocarbon at 200° C. to 600° C. in presence of dehydrating and dehydrogenating catalyst consisting of at least one oxide selected from alumina, thoria, magnesia and silica. No. 2,410,445. Vladimir Ipatieff and Herman Pines to Universal Oil Products Co.

Methods of preparing stilbene derivatives. No. 2,410,463. Otto Schwarzkopt to Burton T. Bush, Inc.

Compound selected from class consisting of free amine and corresponding acid addition salts thereof in which free amine possesses structural formula described in patent. No. 2,410,469. Gerritt Van Zoeren to The Wm. S. Merrell Co.

Separating butadiene from solution of cuprous-cupric ammonium acetate containing excess of ammonia includes extracting butadiene from solution in absorber by action of liquid hydrocarbon stripping agent immiscible with solution having boiling point above butadiene, separating stripping agent from butadiene in desorber by blowing therethrough gaseous medium immiscible with stripping agent and butadiene, separating medium from butadiene, returning part of butadiene in liquid form to top of desorber to reflux vapors of liquid hydrocarbon. No. 2,410,496. Robert Graff to The Girdler Corp.

Improved process for production of diisopropyl by reaction of isobutane and ethylene in presence of liquid hydrocarbon-$AlCl_3$ complex catalyst. No. 2,410,498. Harold Hepp to Phillips Petroleum Co.

Producing glycerine by fermentation of sugar with yeast, in which reduction of acetaldehyde formed intermediary during fermentation process is prevented by known means, combination of steps comprising use of commercial brewers' yeast in amount exceeding amount of yeast merely sufficient for fermentation of given amount of sugar, continuously stirring reaction mass, bubbling added carbon dioxide therein, maintaining pH of 7.2-7.5 during reaction. No. 2,410,518. Carl Neuberg and Irene Roberts.

Polyhalogenated olefins. No. 2,410,541. Robert Joyce, Jr., to E. I. du Pont de Nemours & Co.

Allyl and methallyl esters of lactic and alpha-acetoxypropionic acids. No. 2,410,551. Chessie Rehberg and Charles Fisher to the Secretary of Agriculture of the United States of America.

Producing alkylated aromatic compounds comprises reacting at 0° to 150° C. in presence of liquid hydrogen fluoride aromatic hydrocarbon and aliphatic unsaturated ketone in which hydrogen is attached to at least one of carbon atoms adjacent to carbonyl carbon atom. No. 2,410,554. Herman Pines and Vladimir Ipatieff to Universal Oil Products Co.

Asymmetrical chemical compound which contains single 2:4-diaryl-pyrrole nucleus and has general formula described in patent. No. 2,410,604. Eric Goodings and Maurice Rogers to Imperial Chemical Industries, Ltd.

Sulfamyl benzotriazoles. No. 2,410,619. Charles Allen and Alan Bell to Eastman Kodak Co.

Sulfonamidobenzimidazoles. No. 2,410,620. Charles Allen and Alan Bell to Eastman Kodak Co.

Heat-stabilized composition comprising at least one aryl sulfonamide of formula type described in patent. No. 2,410,635. John Craver to Monsanto Chemical Co.

Treatment of saturated cyclic hydrocarbon to produce only those partial oxidation products containing same number of carbon atoms per molecule as said saturated cyclic hydrocarbon and containing one atom of oxygen per molecule. No. 2,410,642. Adalbert Farkas and Arthur Stribley, Jr., to Union Oil Co. of California.

Producing allyl chloride comprises causing mixture of one molecular proportion of chlorine to react in gas phase with at least two molecular proportions of compound selected from propane and propyl chloride at 500° to 700° C., while passing gas mixture through reaction space charged with metal selected from chromium-nickel alloys and chromium-nickel-iron alloys which are stable to action of hydrogen chloride. No. 2,410,647. Walter Flemming and Gerhard Stein to General Aniline & Film Corp.

Apparatus for hydrogenation of oils, combination with vertical hydrogenation chamber having bottom and cover, of plurality of tubes, removable containers for catalyst, positioned one in each tube, tubes arranged in parallel inside chamber and aranged parallel to longitudinal axis of chamber and having upper ends spaced from cover, etc. No. 2,410,670. Leopold Manderstam and Lionel Warner.

Recovery of cyclo-trimethylenetrinitramine from mixtures comprising

cyclo-trimethylenetrinitramine and nitrotoluene comprises treating mixture with amount of acetone sufficient to dissolve cyclo-trimethylenetrinitramine and nitrotoluene, filtering, adding water slowly in amount to filtrate, with stirring, to effect precipitation of cyclo-trimethylenetrinitramine without precipitation of appreciable amount of nitrotoluene filtering off precipitated cyclo-trimethylenetrinitramine. No. 2,410,699. Joseph Wyler to Trojan Powder Co.

Preparing esters of lactic acid with allyl, crotyl, alpha-methyl allyl, methallyl, beta-chloro allyl, beta-methyl crotyl, ethyl, propyl, isopropyl, primary butyl, secondary butyl and isobutyl alcohols comprises reacting one of alcohols, in presence of alkodixe of metal as catalyst, with anhydrous distillation residue remaining after production of lactate from one of alcohols by esterification with lactic acid. No. 2,410,740. John Jones to Libbey-Owens-Ford Glass Co.

New compound N-(para-amino-benzene-sulphonylyl)-1-hydroxy-4-amino-2-naphthoic acid. No. 2,410,772. Gordon Butler, Ezra Lozinski and Arthur Odell.

Hydrolyzing ethylene cyanohydrin in aqueous solution of alkali metal hydroxide, adding sufficient sulfuric acid to resulting solution to convert alkali metal hydracrylate thus formed into free hydracrylic acid and alkali metal salt of sulfuric acid, evaporating water to lease hydracylic acid and precipitated alkali metal salt of sulfuric acid, separating alkali metal salt from hydracrylic acid, etc. No. 2,410,776. Harold Davis to American Cyanamid Co.

New compounds, N-(p-hydroxyaryl) pyrroles having structural formula described in patent. No. 2,410,783. Albert Hardman to Wingfood Corp.

Condensation product having one hydroxyl and one carboxyl **end group** and consisting of repeating units of general formula described in patent. No. 2,410,788. Willard Morgan and Earle McLeod to Arnold, Hoffman & Co., Inc.

Condensation product having one hydroxyl and one carboxyl end group and consisting of repeating units of general formula described in patent. No. 2,410,789. Willard Morgan and Earle McLeod to Arnold, Hoffman & Co., Inc.

Amino esters of diaryl succinic acids. No. 2,410,791. Karl Pleger and Arthur Hill to American Cyanamid Co.

A p-substituted benzene sulfonamido pyrimidine compound having formula described in patent. No. 2,410,793. Philip Winnek and Richard Roblin, Jr., to American Cyanamid Co.

4:4'-diamidino-diphenylether-di - beta - hydroxyethane-sulphonate. No. 2,410,796. George Newbery and Alexander Easson to May & Baker, Ltd.

Igniting composition consisting of polymeric thiocyanogen and oxidizing agent. No. 2,410,801. Ludwig Audrieth.

Production of vinyl cyanide comprises subjecting succinonitrile vapor to pyrolysis at 300 to 700° C. in presence of catalyst comprising alkali metal cyanide on solid support. No. 2,410,820. Charles Harris to E. I. du Pont de Nemours & Co.

Recovering pyridine from hydrocarbon oil containing it by contacting oil and aqueous solution of mineral acid selected from sulphuric acid and phosphoric acid of 20 to 30% concentration to convert pyridine to pyridine salt of acid, removing resulting pyridine salt in aqueous solution from oil, heating separated aqueous solution of pyridine salt to distill off free pyridine and to leave mineral acid residue, etc. No. 2,410,906. Hubert Stewart to Koppers Co.

De-sliming fatty oil comprising mixing into oil substantially saturated water solution of solid acid selected from sulfamic acid, oxalic acid, citric acid, picric acid and maleic acid in amount to break slime dispersion, mixing into mixture sold filteraid powder to absorb water solution remaining after mixing with fatty oil, filtering out filteraid, acid and water with slime from purified oil. No. 2,410,926. William Bush and Edward Lasher to California Flaxseed Products Co.

In manufacture of 2-methyl-3-hydroxy-4,5-dihydroxymethyl pyridine (vitamin B_6) **steps** comprising reacting 2-methyl-4-phenoxymethyl-5 - cyano - 6-hydroxy - pyridine-3-carboxylic acid with phosphorus pentachloride and with hydrazine in presence of alkali, etc. No. 2,410,938. Max Hoffer to Hoffmann-La Roche, Inc.

The compound 2 - methyl-3-carbalkoxy-amino - 4 - phenoxymethyl - 5-cyano -6-chloropyridine. No. 2,410,939. Max Hoffer to Hoffmann-La Roche, Inc.

The compound 2 - methyl - 3- carbalkoxyamino - 4 - phenoxymethyl - 5 - hydroxy - methyl-pyridine. No. 2,410,941. Max Hoffer to Hoffmann-La Roche, Inc.

Derivatives of 3,4 - dihydroxy-thiophan and process for the manufacture of same. No. 2,410,948. Paul Karrer to Hoffmann-La Roche, Inc.

Aqueous solution of flavon glucosides and aglucones thereof, containing said substance in amount greater than that soluble by itself in aqueous solution, and sarcosin anhydride present in amount to maintain said solubility. No. 2,410,949. Walter Karrer to Hoffmann-La Roche, Inc.

Treating protein materials to convert alpha amino acid content into metal salts of carboxylic acid substituted amines having desired mono to polymolecular chain length protein hydrolysate substituent group therein. No. 2,411,019. Frederick Bersworth.

Synthesis of organic compounds comprises reacting alkylatable aromatic compound with alkylating agent under alkylating conditions in presence of boron trifluoride and acid fluoride. No. 2,411,047. Carl Linn and Vladimir Ipatieff to Universal Oil Products Co.

2-Chloroalkylimide chlorides. No. 2,411,064. Edwin Shand to Sinclair Refining Co.

Conjugating polyene compound chosen from unconjugated polyene fats and fatty acids comprises heating polyene compound in presence of iodide chosen from ammonium iodide, aliphatic amine hydroiodides and aromatic amine hydroiodides, discontinuing heating after substantial conjugation has been effected, but before conjugated polyene compound becomes heat-bodied. No. 2,411,111. Anderson Ralston and Otto Turinsky to Armour & Co.

Conjugating polyene compound chosen from unconjugated polyene fats and fatty acids comprises heating polyene compound in presence of aliphatic iodide having iodine linked to carbon atom, discontinuing heating after substantial conjugation has been effected, but before conjugated polyene compound becomes heat bodied. No. 2,411,112. Anderson Ralston and Otto Turinsky to Armour & Co.

Conjugating polyene compound chosen from unconjugated polyene fats and fatty acids comprises heating polyene compound in presence of inorganic iodide chosen from iodides of elements of third, fourth and fifth groups of periodic system, discontinuing heating after conjugation of polyene compound has been effected, but before conjugated polyene compound becomes heat bodied. No. 2,411,113. Anderson Ralston and Otto Turinsky to Armour & Co.

In method of producing ester by esterification of organic acid with alcohol, one of which is unsaturated, improvement comprises effecting esterification by means of catalyst comprising intumesced alkali metal silicate. No. 2,411,136. Stewart Luce to Monsanto Chemical Co.

*Packaging

Closing and sealing open top of bag of intucked type, consists in securing anchor elements to certain wall portions at sides of bag top, which anchor elements have ends projecting above upper edges of bag top walls, intucking edge walls of bag top between side walls thereof, pressing all walls into flatwise relation, etc. No. 2,409,621. William Geimer and Frank Linda to Bemis Bro. Bag Co.

Bag opening and filling apparatus. No. 2,409,626. Michael Harrington and Samuel Hammer.

Paper bottles and method manufacture. No. 2,409,655. James Annen to Sutherland Paper Co.

Fiberboard container having reinforced ends and integral hinged closure. No. 2,409,673. Walter Glascoff, Jr., and Charles Evert to Downing Box Co.

Machine for banding article with label. No. 2,409,724. Charles Walter and Lowell Newton to Industrial Patents Corp.

Sealing containers having side sealing surface with skirted metallic closure blank having annular bulge formed between skirt and closed end of blank, and having oversize liner disposed therein. No. 2,409,788. Andrew Osborne to Aluminum Co. of America.

Sealing containers having side sealing surface with blank having top portion, depending skirt, inwardly extending annular shoulder in skirt in spaced relation to top portion, liner of greater diameter than outside diameter of mouth of container to be sealed disposed within skirt below shoulder. No. 2,409,789. Andrew Osborne to Aluminum Co. of America.

Means for securing filler caps and like fittings to fluid container having filling aperture, comprising inner annular member and outer annular member between which edge of apertured container material is held, etc. No. 2,409,907. Leonard Shakesby and Charles Sutherland and Sydney Smith to Imperial Chemical Industries, Ltd.

Dispensing device for applying fluid to work comprising supply vessel and closure for latter, comprising longitudinally rounded shank portion, transition portion and laterally rounded ridge portion, segmented into plurality of tines normally closed together and adapted to be spread apart by flexing tines in direction parallel to ridge portion and thereby providing communication between supply vessel and work. No. 2,409,933. Harry Fleisher and Jacob Homer.

Composite strip for continuous production of puncture-proof fluid-tight packages. No. 2,409,998. Harry Waters.

Heavy-duty paper shipping carton having interlocking end closure. No. 2,410,148. Frederick Buhrmaster to Gaylord Container Corp.

In carboy construction, combination of bottle having upper and lower shoulders, box structure encasing bottle and including corner posts, having transverse notches opposite to upper and lower shoulders of bottle, resillient cushions affixed to carrying members set into notches, etc. No. 2,410,179. Joseph Nygren to United States Rubber Co.

Apparatus for partially folding foldable end closures of paper containers. No. 2,410,587. Charles Monroe to The American Paper Bottle Co.

Machine for sealing open mouth of bag. No. 2,410,834. Edwin Messmer to Amsco Packaging Machinery, Inc.

In dispensing container, tubular enclosing member of rectangular cross-section comprising side and top and bottom walls, open top tray for articles to be dispensed slidably mounted in enclosing member and comprising bottom wall and side and end walls, etc. No. 2,410,923. Charles Beardsley to Miles Laboratories, Inc.

Liquid-container closure having therein sealing gasket comprising mixture of artificial fibers, comprising fibers which will swell in liquid held in container and other fibers which are inert to liquid, said other fibers adhering to swellable fibers to bind them and fix them in position in resilient, compressible fibrous structure which does not suffer loss of form as result of swelling of swellable fibers. No. 2,411,012. Roger Wallach to American Viscose Corp.

Producing collapsible tin coated metal tube container with integral spout, comprises extruding container and spout from tin coated lead blankso that tin coating is formed on both inside and outside, superimposing further layer of non-toxic and non-corrodible metal on inside and outside of only spout region by electro deposition. No. 2,411,024. Otto Bruun.

Collapsible tube closure. No. 2,411,058. John Rockwell.

Carton blank formed and hinged for folding into receptacle having cover and separate cover retaining means. No. 2,411,134. Russell Lambert to Brooks Bank Note Co.

*Paints, Pigments

Making zinc yellow comprises preparing solution of soluble zinc salt, preparing second solution containing chromate ions, and third solution containing hydroxyl ions, one of solutions containing potassium ions, in ratio of at least 0.5 molar equivalent of potassium and from 0.8 to 1.0 molar equivalent of chromate per molar equivalent of zinc, and 0.5 to 0.875 molar equivalent of hydroxyl per molar equivalent of chromate, passing solutions simultaneously and in above molar ratio of ingredients into precipitating tank, whereby zinc yellow of high color value and good color is precipitated. No. 2,410,916. Edwin Wilson and William Newman to Interchemical Corp.

*Paper, Pulp

Making coated water-resistant rigid porous structural vegetable fiber board comprises forming water slurry of wet vegetable fibers carrying waterproofing agent deposited therein, forming slurry in wet structural-board-making mat, coating wet mat with composition having sufficient pigment to hide surface fibers, having also aqueous vehicle in which is carried binder capable of binding pigment to fiber and to itself upon loss of vehicular water. No. 2,409,628. Clark Heritage to Wood Conversion Co.

Making coated rigid porous structural fiber board comprises coating wet structural-board-forming mat of fibers with composition having sufficient pigment to hide surface fibers, and having aqueous vehicle in which is dispersed heat-reactive binding material capable of binding pigment to fiber and to itself, etc. No. 2,409,629. Clark Heritage to Wood Conversion Co.

Making coated, rigid, porous, structural vegetable-fiber board comprises forming water slurry of wet vegetable fibers, forming slurry into wet-structural-board-forming mat, which, when dried, yields rigid, porous, structural board, coating wet mat with fluid aqueous coating composition having therein pigment including major portion of white pigment selected from lithopone and titanated lithopone, etc. No. 2,409,630. Clark Heritage and Henry Walter to Wood Conversion Co.

Creping machine for paper and other web material. No. 2,410,189. Louis Straubel and James Straubel; said Louis Straubel to said James Straubel, as trustee.

Warning alarm signal for paper machines. No. 2,410,249. Harry Spencer to Howard Smith Paper Mills, Ltd.

In combination with surge and head boxes of paper making machine, means for initially decelerating flow fo effluent stock discharged from surge box and for converting its velocity energy into pressure, means for spreading stock while under considerable pressure and as it flows away from decelerating means, means for directly delivering spread stock under pressure into lower portion of first pass of head box throughout entire width of latter, means for locally varying cross-sectional

* *Continued from Vol. 591, Nos. 4, 5, Vol. 592, Nos. 1, 2.*

area of delivery means to insure uniform distribution of stock. No. 2,410,526. John Rosmait to D. J. Murray Manufacturing Co.

Fiberboard cushioning filler for cartons. No. 2,410,591. William Turner to O. B. Andrews Co.

Apparatus for automatic surface finishing of wax impregnated paper articles such as tubular paper portions of shotgun shells comprising elongated vessel having depression along portion thereof for containing solvent and drain sheet extending outwardly from one end of depression, connected to vat to drain thereinto, heating means for vat, upwardly extending walls around vat and drain sheet, cooling means for walls, conveyor having means thereon for holding articles being treated, etc. No. 2,411,042. William King, Nicholas Romanchuk and Wilbert Ward to Federal Cartridge Corp.

*Petroleum

Preparing catalyst to promote and catalyze reaction between isoparaffin and olefin comprises contacting aluminum chloride with isoparaffin and lower olefin and alkyl chloride or hydrogen chloride at elevated temperatures and pressures. No. 2,409,681. Ralph Hill and Charles Watkins to Standard Oil Development Co.

Petroleum hydrocarbon material containing small quantity, sufficient to stabilize said material of reaction product of sulfide of phosphorus, etc. No. 2,409,686. John McNab and Dilworth Rogers to Standard Oil Development Co.

Removing sulfur compounds from low boiling hydrocarbon oils comprises continuously passing mixture of hydrocarbon oil vapors and hydrogen through treating zone, contacting oil vapors within treating zone with desulfurizing catalyst, etc. No. 2,409,690. Edward Nicholson and Aaron Redcay to Standard Oil Development Co.

Recovering distillate from high pressure gas, comprising contacting gas with lean heavy oil in absorption zone to form rich heavy oil, flashing vapors from rich absorption oil, passing vapors to second absorption zone, contacting them with lean light absorption oil to form rich light absorption oil, etc. No. 2,409,691. Frank Noble to Standard Oil Development Co.

Increasing aromaticity of petroleum naphtha comprises charging feed naphtha to first reaction zone where it contacts molybdenum oxide-alumina catalyst at 850°-1100° F., simultaneously charging hydrogen-containing gas to reaction zone, maintaining 100 pounds per square inch, etc. No. 2,409,695. Kenneth Laughlin to Standard Oil Development Co.

Machinery lubricant for use at high temperatures comprising major proportion of mineral oil base stock, minor proportion, of metal salt of polybasic inorganic acid which contains at least one oil-solubilizing organic group, and minor proportion of higher alcohol. No. 2,409,726. Carl Winning and John McNab to Standard Oil Development Co.

Production of tetra-isobutylene by polymerization of di-isobutylene without formation of substantial amounts of tri-isobutylene, comprises subjecting di-isobutylene in liquid phase to action of phosphorus pentoxide at 0° C. to 100° C. No. 2,409,727. Grant Bailey to Phillips Petroleum Co.

Improved motor fuel for supercharged spark ignition engines comprising mixture of methyl tertiary butyl ether and gasoline hydrocarbons containing substantial amount of hydrocarbons selected from iso-octane, neohexane, triptane, and mixtures thereof. No. 2,409,746. Theodore Evans and Alfred Cataneo to Shell Development Co.

In process wherein bed of subdivided solid material susceptible to damage at high temperature is contacted in confined zone with oxidizing gas to burn combustibles from bed and resulting gaseous products, including any incompletely oxidized combustibles and unconsumed free oxygen, are discharged from bed and from zone through region within latter containing solid particles and in which the solid particle concentration is insufficient to effect the rapid dispersion of heat developed therein, the method of preventing development of temperature within said region which would cause damage to solid material. No. 2,409,751. Clarence Gerhold and John Burgess to Universal Oil Products Co.

Lubricant composition containing an oil and in combination from 0.001% to 5% of polyamino poly-aryl methane and from 0.001% to 10% of neutralized phosphorus- and sulfur-containing reaction product of phosphorus sulfide and hydrocarbon. No. 2,409,799. Edward Roberts to Standard Oil Co.

Producing mixture of C_5 hydrocarbons containing high proportion of amylenes comprises: subjecting hydrocarbon fraction consisting of normal hexane to 1000° F. to 1300° F. while in presence of added amounts of hydrocarbons from group consisting of ethane, ethylene, propane, and propylene, in absence of added hydrocarbons; fractionally distilling resulting products, separating mixture of C_5 hydrocarbons. No. 2,409,815. Clare Viland and Herschel Hyde to Tide Water Associated Oil Co.

Lubricating oil composition comprising major proportion of petroleum lubricating oil and minor proportion, to retard oxidation of oil, of inhibitor resulting from reaction of alkylated phenol with condensation product of turpentine and phosphorus pentasulfide, alkyl group of alkylated phenol being saturated aliphatic radical. No. 2,409,877. Robert May to Sinclair Refining Co.

Lubricating oil composition comprising major proportion of petroleum lubricating oil and minor proportion, to retard oxidation of oil, of reaction product of zinc oxide and organic compound resulting from reaction of alkylated phenol with condensation product of turpentine and phosphorus pentasulfide, alkyl group of alkylated phenol being saturated aliphatic radical. No. 2,409,878. Robert May to Sinclair Refining Co.

Catalytic conversion of normal aliphatic hydrocarbons into substantial proportions of corresponding branched chain hydrocarbons comprising dissolving aliphatic hydrocarbon feedstock and aluminum halide catalyst in tetrachloroethane, reacting solution at elevated temperature and under pressure to maintain solution in liquid phase, to form desired branched chain hydrocarbons. No. 2,410,024. Eric Fawcett and John Beynon to Anglo-Iranian Oil Co., Ltd.

Purifying hydrocarbon oil containing a styrene compound, which hydrocarbon oil was produced by cracking gas oil, comprises dissolving sulphur dioxide in hydrocarbon oil, maintaining oil with sulphur dioxide at below 130° F. for 15 minutes in absence of undissolved liquid phase sulphur dioxide, separating reaction product and excess sulphur dioxide from hydrocarbon oil. No. 2,410,042. George Bond, Jr., to Houdry Process Corp.

In process of aromatizing subjecting hydrogen and hydrocarbon of four carbon atoms and naphtha containing non-benzenoid hydrocarbons, at elevated pressure and 800-1200° F., to action of oxide contact-mass formed from co-precipitation from dissolved salts of tin and aluminum and chromium, tin in contact-mass being 1-30 mol per cent. No. 2,410,044. Robert Burk and Everett Hughes to The Standard Oil Co.

Alkylating paraffinic hydrocarbon with olefinic hydrocarbon, improvement comprises contacting paraffinic hydrocarbon and olefinic hydrocarbon in gaseous phase in reaction zone under alkylating conditions, with homogeneous gaseous phase alkylation catalyst consisting of material selected from chlorine derivatives of hydrocarbons, chlorine and bromine, in presence of oxygen, maintaining paraffinic hydrocarbon in excess over olefinic hydrocarbon. No. 2,410,070. Aaron Horton to Socony-Vacuum Oil Co., Inc.

Alkylating paraffinic hydrocarbon with olefinic hydrocarbon, contacting paraffinic hydrocarbon and olefinic hydrocarbon in reaction zone under alkylating conditions, with alkylation catalyst consisting of halogen selected from chlorine and bromine, maintaining excess of paraffinic hydrocarbon over olefinic hydrocarbon. No. 2,410,071. Aaron Horton, John Brooks and Arlie O'Kelly to Socony-Vacuum Oil Co., Inc.

Alkylating isobutane with propylene, comprises contacting isobutane with propylene, in gaseous phase, in reaction zone under alkylating conditions including temperature between 750° F. and 850° F. and pressure in excess of 2500 pounds per square inch, with alkylation catalyst consisting of halogenated hydrocarbon selected from chlorine derivatives of acyclic hydrocarbons and bromine derivatives of acyclic hydrocarbons. No. 2,410,072. Aaron Horton, John Brooks and Arlie O'Kelly to Socony-Vacuum Oil Co., Inc.

Alkylating paraffinic hydrocarbon with olefinic hydrocarbon, comprises contacting paraffinic hydrocarbon with olefinic hydrocarbon, in gaseous phase in reaction zone under alkylating conditions including temperature varying between 590° F. and 850° F. and pressure in excess of 500 pounds per square inch, with alkylation catalyst consisting of halogenated hydrocarbon selected from chlorine derivatives of acyclic hydrocarbons and bromine derivatives of acyclic hydrocarbons, etc. No. 2,410,107. Alexander Sachanen and Arlie O'Kelly and Claude Myers to Socony-Vacuum Oil Co., Inc.

Alkylating paraffinic hydrocarbon with olefinic hydrocarbon, improvement comprises contacting paraffinic hydrocarbon and olefinic hydrocarbon in gaseous phase in reaction zone under alkylating conditions including temperature varying between 590° F. and 850° F. and pressure in excess of 500 pounds per square inch, with alkylation catalyst consisting of material selected from acyclic organic halogen compounds, alicyclic organic halogen compounds, and aromatic organic halogen compounds, etc. No. 2,410,108. Alexander Sachanen, Arlie O'Kelly and Claude Myers to Socony-Vacuum Oil Co., Inc.

Producing alkylated aromatics comprises reacting aromatic with olefin in presence of silica and zirconia, and producing alkylated aromatics by reacting aromatic with olefin in presence of silica, alumina and zirconia. No. 2,410,111. Charles Thomas and Vladimir Haensel to Universal Oil Products Co.

Alkylation process comprises reacting aromatic hydrocarbon with olefin in reaction zone containing solid packing material, introducing to zone carrier gas containing aluminum chloride vapors, maintaining zone at alkylating temperature to condense aluminum chloride vapors on packing material. No. 2,410,151. Joseph Danforth to Universal Oil Products Co.

Continuously catalytically cracking heavier petroleum hydrocarbons in presence of particle-form solid catalyst material wherein catalyst is moved downwardly through conversion zone operating under pressure as substantially compact column of particles and vapors of heavier hydrocarbons are passed under cracking conditions through column of catalyst, etc. No. 2,410,309. Thomas Simpson, John Payne and John Crowley, Jr., to Socony-Vacuum Oil Co., Inc.

Production of high octane motor fuel. No. 2,410,316. Charles Thomas to Universal Oil Products Co.

Lubricating oil composition comprising 25% to 99% by weight of mineral lubricating oil and 1% to 75% by weight of synthetic lubricating oil blending agent having viscosity above 10,000 seconds Saybolt Universal at 210° F., lubricating oil blending agent being produced by chlorinating paraffin wax, dechlorinating chlorinated paraffin wax at 400° F. to 600° F., etc. No. 2,410,381. Vance Jenkins to Union Oil Co. of California.

Converting hydrocarbons comprises subjecting hydrocarbons at elevated temperature to activated aluminated acid leached montmorillonite clay. No. 2,410,436. Frederick Ewing to Filtrol Corp.

In art of dewaxing oils process of forming uniform wax crystals comprises introducing heated stream of wax bearing oil into elongated blending passageway, injecting streams of cool dewaxing solvent into stream of wax bearing oil at successive stages in passageway to gradually form cooled solution containing minute wax nuclei crystals at approximately cloud point of solution, injecting streams of colder dewaxing solvent into stream of waxy solution at successive additional stages, etc. No. 2,410,483. Eddie Dons and Oswald Mauro to Mid-Continent Petroleum Corp.

Mineral oil composition comprising viscous mineral oil fraction having in admixture therewith minor proportion, sufficient to depress pour point of oil fraction, of lignin ester of aliphatic acid having at least 16 carbon atoms. No. 2,410,578. John Giammaria to Socony-Vacuum Oil Co., Inc.

Lubricant consisting of mixture of aluminum soap and lead soap in ratio of three to one by weight. Lubricant consisting of mixture of aluminum soap and lead soap in the proportion weight ratio of three to one dissolved in sufficient solvent to permit grease gun use, lubricant being insoluble in acids petroleum hydrocarbons. No. 2,410,610. Armand Pickett to Phillips Petroleum Co.

Lubricant composition comprising major proportion of viscous hydrocarbon oil and oil-miscible metal salt of wax-phenyl-substituted thio acid of phosphorus in amount to exert detergent and anti-corrosive properties in oil under heavy duty service, wax group containing at least twenty carbon atoms. No. 2,410,650. John Giammaria to Socony-Vacuum Oil Co., Inc.

Low ash content lubricating oil for high temperature internal combustion engines containing oil miscible metal salt of condensation product of aldehyde and aromatic hydroxy compound in amount to give high temperature detergent action, but not exceeding 0.25%, based on sulfate ash, and oxidation-inhibiting quantity of oil-soluble, relatively stable aromatic amine anti-oxidant. No. 2,410,652. John Griffin, Jr., and Paul Van Ess to Shell Development Co.

Composition comprising hydrocarbons containing knock-reducing amount of mono-nuclear aromatic amine in which total number of carbon atoms in all alkyl radicals is less than 7 and stabilizing amount of 2,4-dialkyl phenol in which one alkyl substituent is selected from primary, secondary and tertiary alkyl radicals and other alkyl substituent is selected from primary and secondary alkyl radicals. No. 2,410,829. Daniel Luten, Jr., to Shell Development Co.

Gasoline type motor fuel containing stabilizing amounts of 2,4-dimethyl-6-tertiary butyl phenol and mononuclear aromatic amine in which total number of carbon atoms in all alkyl radicals is less than 7. No. 2,410,846. Ernest Walters to Shell Development Co.

Composition comprising gasoline hydrocarbons containing knock-reducing amount of mononuclear aromatic amine in which total number of carbon atoms in all alkyl radicals is less than 7 and stabilizing amount of di-orthopara polyalkyl phenol in which para substituent is selected from hydrogen atoms and methyl and ethyl radicals, one ortho radical selected from primary, secondary and tertiary alkyl radicals, other ortho radical selected from primary and secondary alkyl radicals. No. 2,410,847. Ernest Walters to Shell Development Co.

Composition comprising major proportion of waxy mineral lubricating oil and small but pour depressing amount of high molecular weight product non-volatile up to about 600° F. under reduced pressure, soluble in waxy mineral lubricating oil and having property of depressing pour point when added in small amounts, said product being Friedel-Crafts recondensation product of only high molecular weight oil-soluble pour

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depressing fraction, etc. No. 2,410,885. Eugene Lieber to Standard Oil Development Co.

In hydrocarbon conversion process wherein paraffinic hydrocarbons boiling in butane to hexane boiling range are contacted with aluminum chloride catalyst and added hydrogen chloride in contacting zone under conversion conditions and aluminum chloride-hydrocarbon complex is obtained, method of operation comprises withdrawing complex from contacting zone to treating zone, treating complex in treating zone with 50% to 100% sulfuric acid to liberate large amount of hydrogen chloride and introducing liberated hydrogen chloride into contacting zone. No. 2,410,886. Arthur Lien and Edmond d'Ouville to Standard Oil Co.

Continuous method for reforming naphthas comprises charging mixture of hydrogen-containing gas and petroleum naphtha to reaction zone containing lower dense phase suspension and upper dilute phase suspension of powdered catalyst in gasiform reactants comprising naphtha undergoing reforming, catalyst consisting of zinc spinel carrier supporting one of the class of group VI oxides consisting of molybdenum oxide and chromium oxide, etc. No. 2,410,891. Richard Meinert and Philetus Holt, 2nd, to Standard Oil Development Co.

Improved process of producing isobutane from normal butane comprises contacting normal butane vapor at 20° C. to 150° C. with solution of aluminum halide catalyst in liquid which does not form stable addition complexes with aluminum halides and does not react with aluminum halides to produce undesirable by-products, etc. No. 2,410,894. Charles Montgomery to Gulf Research & Development Co.

Producing high octane number motor fuel from charging stock of class consisting of gas oil and heavier hydrocarbons comprises thermally and non-catalytically cracking charging stock to produce thermally cracked naphtha having end point below 450° F. together with lighter and heavier products, etc. No. 2,410,908. Ernest Thiele and Carl Hull to Standard Oil Co.

Desalting and/or dewatering oil comprising placing oil under pressure, adding water and gas, mixing oil, water and gas, heating mixture, ejecting mixture into region of reduced pressure to permit formation of gas bubbles, separating oil from water and gas. No. 2,410,970. Jesse Guyer to Phillips Petroleum Co.

Separating butadiene from hydrocarbon mixtures containing it and C_4 mono-olefins comprises subjecting C_4 hydrocarbon mixture of olefins to contact with polyethylene glycol having molecular weight in range from that for tetraethylene glycol up to 1000, selectively dissolving butadiene in glycol during contact, withdrawing solution from undissolved mono-olefin hydrocarbons, recovering dissolved butadiene from glycol solvent. No. 2,411,025. Charles Coghlan to The Texas Co.

Catalytically converting normal butane to more valuable saturated hydrocarbons, comprises forming hydrocarbon feed mixture of normal butane and containing minor proportions of isobutane and normally gaseous olefin, olefin present in 0.5 to not in excess of 10 volume per cent of total hydrocarbon feed mixture, and isobutane present in from 1 to 10 mols per mol of olefin but not exceeding amount which provides about 50% by volume on basis of normal butane undergoing conversion in reaction zone, passing hydrocarbon feed mixture to reaction zone and contacting same in liquid phase with aluminum halide catalyst and hydrogen halide promoter under conditions including temperature within range of 100 to 175° F., etc. No. 2,411,054. Ernest Pevere to The Texas Co.

Treating mixture comprising hydrocarbons with aqueous alkaline treating solution of compound selected from alkaline alkali metal compounds and alkaline ammonia compound whereby two phases are produced. No. 2,411,083. Orris Davis and Alan Nixon to Shell Development Co.

Treating mixture comprising hydrocarbons with aqueous alkaline treating liquid to effect separation of components of mixture which are soluble in treating liquid from components which are not soluble therein, in which process two phases are produced, first phase comprising hydrocarbons and second phase comprising aqueous alkaline treating liquid and at least substantial portion of components of mixture which are soluble therein. No. 2,411,105. Alan Nixon and David Yabroff to Shell Development Co.

Recovering concentrated styrene fraction from mixture thereof primarily with ethyl benzene comprises subjecting mixture to azeotropic distillation in presence of ethylene glycol mono-ethyl ether, removing as overhead from distillation, binary azeotrope primarily of ethyl benzene and ethylene glycol mono-ethyl ether and recovering concentrated styrene fraction from distillation. No. 2,411,106. Theodor Petry and Grady Payne to Socony-Vacuum Oil Co., Inc.

*Photographic

Producing iodine image, comprises forming image in silver in permeable, relatively water-insoluble carrier, transforming silver image to image formed of relatively water-insoluble oxidizing agent, reacting last-named image with iodide in presence of solvent for water-insoluble oxidizing agent which dissolves the latter and causes it to release iodine from iodide whereby iodine which is released replaces oxidizing agent to form image in iodine. No. 2,409,923. Arthur Barnes and Helen Husek to Polaroid Corp.

Producing dichroic image, comprises photo-exposing silver halide suspension to produce latent image, developing latent image to form image comprising water-insoluble oxidizing agent having oxidation potential sufficiently high to release iodine from iodide, etc. No. 2,409,959. William Ryan, Arthur Barnes and Helen Husek to Polaroid Corp.

Portable combination of photographic flash lamp consisting of light transmitting vessel containing filament and plurality of components adapted to combine chemically upon heating of filament. No. 2,409,967. Louis Weisglass to Simmon Brothers, Inc.

Composition for discharge printing comprising formaldehyde metal sulfoxylate and substance selected from salicylic acid and its salts. No. 2,409,980. Edgar Jensen, Herbert Scull and James McNally to Eastman Kodak Co.

Forming positive photographic print on material sensitive to only one region of visible spectrum. No. 2,409,990. Cyril Staud.

Producing dyestuff image from silver image and uniformly distributed azo-dyestuff in photographic emulsion, step of treating azo-dyestuff in presence of silver image with substance capable of selectively destroying azo-dyestuff by reduction in presence of photographic silver image, in presence of organic compound capable of accelerating destruction, compound selected from diphenylmethane derivatives and triphenylmethane derivatives. No. 2,410,025. Bela Gaspar to Chromogen, Inc.

Developing exposed silver halide layer containing photographic developing agent and excess of organic nitrogen compound capable of generating volatile amine upon application of steam, comprises subjecting exposed layer to action of steam. No. 2,410,644. Scheuring Fierke and Cyril Staud to Eastman Kodak Co.

Photographic emulsion comprising colloidal medium containing light-sensitive silver salts, having added thereto sensitizing compound of general formula described in patent. No. 2,410,689. Samuel Sheppard and Harlow Brigham to Eastman Kodak Co.

Producing image in undeveloped silver halide developing-out emulsion, comprises exposing emulsion and developing it with hydroquinone developing agent at pH of at least 9.5 in presence of compound selected from hydrazine compounds of general formula described in patent. No. 2,410,690. William Smith and Robert Stauffer to Eastman Kodak Co.

Reducing tendency of sensitizing dye to wander from dye-sensitized photographic silver halide emulsion (1) to another photographic silver halide emulsion (2) in contact with emulsion. No. 2,411,096. Edward Knott to Eastman Kodak Co.

Photoengraving includes developing exposed photo-sensitive resist including gelatinous colloid sensitized by chromic acid salt in a solution of substantive dye having detergent action on resist. No. 2,411,108. Frank Powers.

Photoengraving cylinder comprises coating surface of cylinder with layer of photosensitive gelatin resist, exposing resist to desired image and developing exposed resist by treatment with water warmer than body of cylinder to wash away not fully exposed gelatin resists, dyeing resist with substantive dye, hardening resist by chromic acid solution, etching cylinder. No. 2,411,109. Frank Powers.

*Polymers

Polymerizable composition including unsaturated alkyd resin, triallyl phosphate and catalyst for accelerating copolymerization. No. 2,409,633. Edward Kropa to American Cyanamid Co.

Resin-fiber article, comprising compacted and bonded assembly of superimposed interfelted fibrous layers and resin hardened and integrated under heat and pressure, ratio of fibers to resin being greater in certain of layers than in others to produce layers of high resin content and layers of low resin content. No. 2,409,645. Edward Sawyer to The Canal National Bank of Portland.

Polymer of ethylene and methyl alpha-chloracrylate having ethylene to ester mole ratio of 1.9:1. No. 2,409,679. William Hanford and John Roland to E. I. du Pont de Nemours & Co.

Apparatus for molding plastic material comprising hopper for distributing pellets thereof, loading carriage comprising upper and lower plates, upper plate having plurality of apertures to receive pellets, lower plate similarly apertured, so that in one relative position it supports and in another it releases pellets in upper plate apertures, etc. No. 2,409,725. James Whitmore, William Makenny and Frank Newcombe to Westinghouse Electric Corp.

Plastic milk carton case. No. 2,409,748. Louis Folst to Edgewick Investment Co.

Laminated transparent closure comprising: two panes of transparent material of substantially same surface area; layer of transparent plastic material between panes and bonding same together; plastic means bonded to outer surfaces of panes adjacent marginal edges to provide adhering gasket means extending completely around closure at margins only of both outer sides thereof. No. 2,409,808. Charles Sowle to Lockheed Aircraft Corp.

Filling container with cellular mass of solid vinyl aromatic resin, steps of introducing into container granular vinyl aromatic resin in amount corresponding to resin content of cellular mass with which container is to be filled, thereafter introducing into container, normally gaseous agent capable of being dissolved by resin to swell latter to gel, etc. No. 2,409,910. Kenneth Stober to The Dow Chemical Co.

In emulsion polymerization process for polymerization of mixture of butadiene and acrylonitrile in ratio of three parts by weight of butadiene for each part by weight of acrylonitrile, steps in combination of mixing mixture of butadiene and acrylonitrile with water in presence of emulsifying agent comprising water soluble soap and peroxide polymerization catalyst, agitating material to maintain mixture in emulsion in water, etc. No. 2,409,915. Byron Vanderbilt and Ralph Howe to Jasco, Inc.

Composition of matter comprising copolymerization product of mixture of perhaloethylene containing at least two fluorine atoms, vinyl fluoride, and hydrogen-containing halogenated ethylene other than vinyl fluoride. No. 2,409,948. Elmore Martin to E. I. du Pont de Nemours & Co.

Method of molding prisms. No. 2,409,958. Howard Rogers and Dexter Cooper, Jr., to Polaroid Corp.

Treating surface of paper containing melt coating of cellulose ester and plasticizer to inhibit tackiness when contacted with hot surface comprises contacting at least one surface of paper melt coated with mixture of cellulose ester and plasticizer with only sufficient alcohol of 1-4 carbon atoms to wet same, and evaporating alcohol from surface. No. 2,409,984. Wendell McDowell to Eastman Kodak Co.

Non-blocking melt-coating composition adapted to give coatings of low moisture vapor permeability, consisting of at least 40% of heat-stable butyric acid ester of cellulose having butyryl content of at least 42% and total acyl content of at least 50%, etc. No. 2,409,985. Martin Salo to Eastman Kodak Co.

Non-blocking melt-coating composition adapted to give coatings of low moisture vapor permeability, consisting of at least 40% of heat-stable butyric acid ester of cellulose having butyryl content of at least 46% and total of acyl content of at least 50%, etc. No. 2,409,986. Martin Salo to Eastman Kodak Co.

In process involving polymerization of ethylene at 100 to 400° C. and pressure between 400 and 3000 atmospheres, step comprises conducting polymerization in presence of from 0.0005 to 2% of alkyl hydroperoxide based on total weight of monomers charged into reactor. No. 2,409,996. Milton Roedel to E. I. du Pont de Nemours & Co.

Forming polyesters of high molecular weight comprises esterifying reaction mixture consisting of dihydroxy alkanes and dicarboxy hydrocarbons having lower vapor pressure than dihydroxy alkanes. No. 2,410,073. John Howard to Bell Telephone Laboratories, Inc.

Forming elastic composition free from plastic flow, comprises dissolving polymeric methyl ester of acrylic acid in benzene, passing bromine into solution, separating treated polymer from benzene, mixing it with sodium sulfide, molding mixture to desired shape and vulcanizing with heat. No. 2,410,103. Leo Rainard to National Dairy Products Corp.

Combination with means for holding hot saturant bath for impregnating fibrous insulation surrounding electric conductor, of elongated vacuum chamber operatively communicating with chamber and having removable die at each end thereof for sealing ends of chamber when conductor with its covering of fibrous insulation is drawn through chamber and saturant in continuous manner. No. 2,410,126. John Olson to Anaconda Wire & Cable Co.

Combination with means for holding saturant bath for impregnating fibrous insulation surrounding electric conductor as covered conductor is drawn through bath of saturant in continuous manner, of means for heating fibrous insulation in course of its travel towards bath of saturant until its moisture content is negligible, and vacuum chamber through which dried covered conductor passes. No. 2,410,127. John Olson and Charles Bechle to Anaconda Wire & Cable Co.

Producing resinous composition comprises heating ligneous wood, water, and material selected from higher fatty acids, which contain conjugated system of double bonds and their esters, at 240° C. to 330° C. under superatmospheric pressure until cellular structure of wood has disappeared, water to completely cover wood, recovering resin as residue after removal of water solution. No. 2,410,205. Millard Dusenbury to Hercules Powder Co.

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* *Continued from Vol. 591, Nos. 4, 5, Vol. 592, Nos. 1, 2.*

Providing surface with dense, homogeneous resin coating comprises feeding into flame-spraying device along with fuel gas and oxygen, organic thermoplastic material in form of particles passing 50-mesh screen and retained on 200-mesh screen, thermoplastic material comprising polymer selected from polyvinyl butyral resins of composition described in patent. No. 2,410,225. Maurice Macht and Malcolm Renfrew to E. I. du Pont de Nemours & Co.

Resinous composition of matter comprising polymer of ester of organic acid from group consisting of carbonic acid and orthocarboxylic acids in which ester at least two acid groups of organic acid are esterified with monohydric unsaturated alcohol containing at least three carbon atoms and having aliphatically unsaturated carbon-to-carbon linkage in alpha, beta position with respect to carbinol carbon atom therein. No. 2,410,305. Henry Richter and Henry Rothrock to E. I. du Pont de Nemours & Co.

Apparatus for molding from plastic material elongated articles of revolution of kind having body which includes stem and shoulder portions, ring member having circumferential groove therein, drum member rotatable in ring member and also having circumferential groove therein, grooves of ring and drum members cooperating to define circumferential groove therein, grooves of ring and drum members cooperating to define circumferentially extending mold chamber having cross-sectional shape which is elongated transversely of groove and corresponds with profile of article to be produced, etc. No. 2,410,312. Harold Storch.

Manufacture of nitro-cellulose having high and stable nitrogen content, comprises dissolving cellulose or cellulose containing materials according to viscose in bath containing by weight two thirds sulphuric acid, one fifth nitric acid, the balance being water. No. 2,410,319. Henry Von Kohorn.

Machine for molding thermosetting materials. No. 2,410,324. Reginald Windsor and Emeric Gaspar; said Gaspar to said Windsor.

In method of making plastic articles steps of applying inked design or pattern to surface of cellulosic sheet, drying ink of pattern, treating sheet with thermosetting resin in intermediate stage of polymerization to leave film of resin as coating over pattern, drying sheet, preforming sheet in press to approximately the shape of final article, removing sheet from press, heating sheet, forming sheet in second press by simultaneous action of heat and pressure. No. 2,410,361. Alvin Prance to Briggs Manufacturing Co.

Plastic mixture suitable for molding purposes, comprising calcined anhydrite, zinc sulfate, sodium thiosulfate, glue and water. No. 2,410,390. Lewis Paley to United States Gypsum Co.

Composition comprising incompletely-reacted acid-curing synthetic resin combined with latent curing catalyst comprising olefin-sulfur dioxide polymer. No. 2,410,395. Leonard Smidth to Sylvania Industrial Corp.

Preventing polymerization of styrene monomer comprises incorporating therein proportion of monosulfide of dihydric phenol sufficient to inhibit polymerization. No. 2,410,408. John Durland to Monsanto Chemical Co.

Resin composition comprising homogeneous mixture of polyvinyl acetal resin in which hydroxyl content is between 10% and 20% and from 2 to 30 per cent thereof of organic complex of Werner type in which trivalent chromium atom is coordinated with carboxylic acido group having at least 10 carbon atoms. No. 2,410,414. Charles Johnson to E. I. du Pont de Nemours & Co.

Altering properties of long oil alkyd resins which comprise 73% fatty oil acid glycerides and about 27% glycerol phthalate, comprises incorporation in long oil alkyd resin of from 0.5% to 10% of p-toluene sulpho chloride and heating mixture to between 260° C. and boiling or decomposition point of mixture, whichever is lower, until material is produced which manifests substantial increase in viscosity. No. 2,410,418. Laszlo Auer.

New article of manufacture, laminated sheet material comprising inherently flexible blast-resistant rubber-compounded sheet backing, layer of pressure-sensitive adhesive on one surface of laminated sheet, sheet of treated cellulosic material adhesively secured to backing, coating of cellulose derivative to receive transfer impressions on other surface of laminated sheet. No. 2,410,472. Alfred Wartha to Minnesota Mining & Manufacturing Co.

Apparatus for molding heat plasticizable material, comprising cooperating dies providing molding cavities, one of dies having bore extending from outer face to parting line between dies, cylinder having open end extending into bore, plunger movable within cylinder to force material as cylindrical mass in direction of dies, etc. No. 2,410,510. Nathan Lester to Lester Engineering Co.

Producing laminated materials by pressing together at least two sheets of asphalt-saturated felt with bonding material therebetween comprising two components, one component comprising aqueous rubber dispersion, other component comprising hydraulic-setting cement, steps of applying one component to at least one surface of one sheet, applying other component to at least one surface of other sheet, then pressing sheets together with coated faces opposed to form and activate bonding material by bringing together for first time dispersion and hydraulic-setting cement. No. 2,410,586. Alan McGarvey to Armstrong Cork Co.

Production of interpolymer of isobutylene and methyl acetylene comprises subjecting mixture containing isobutylene and methyl acetylene to action of boron trifluoride at temperature below −10° C. No. 2,410,605. Denis Huebner and James Fearey to Imperial Chemical Industries, Ltd.

In butadiene styrene co-polymer process for manufacture of artificial rubber and recovering of fine co-polymer particles from briny suspensions thereof wherein there are gases liberatable from such suspensions when latter are exposed to subsequent sub-atmospheric pressure conditions, method comprising establishing ever-changing body provided by such suspension and maintaining surface level thereof up to operative elevation, etc. No. 2,410,633. Theodore Counselman to The Dorr Co.

Container for retaining corrosive electrolyte, comprises metal tank, solid thermoplastic lining material positioned within tank to prevent contact between tank and electrolyte, consisting of 40% reclaimed rubber, 43% clay, 12% mineral rubber, 4% cumar resin and 1% paraffin, and layer of adhesive material interposed between tank and lining consisting of 38% of thermoplastic material similar to thermoplastic lining material and balance rosin oil and viscous asphaltic material in ratio of 1 to 10. No. 2,410,681. Olaf Rasmussen and Richard Rike to General Motors Corp.

Non-blocking hot melt-coating composition consisting of cellulose ester having butyryl content of at least 42%, hydrolyzed to no more than two hydroxyl groups per 24 cellulose carbon atoms melting point less than 200° C., char point of at least 260° C. cupramonium viscosity of not more than 10 centipoises, and acetone viscosity of 5-200 centipoises and 25-100% (based on weight of cellulose ester) of mixture of butyl stearate and phthalate selected from dicapryl phthalate, diethoxyethyl phthalate, and dibutoxyethyl phthalate, both components of plasticizer mixture present in amount at least 20% of mixture. No. 2,410,685. Martin Salo and Harold Vivian to Eastman Kodak Co.

Composition of matter comprising methyl polysiloxane resin containing average of from 123 to 1.7 methyl groups per silicon atom, from 5 to 90 per cent by weight of lead monoxide based on weight of resin and, as filler, magnesium titanate. No. 2,410,737. Alfred Jenny to General Electric Co.

Vinyl halide resin capable of resisting discoloration upon heating comprises polymer of from 70 to 100 percent of vinyl halide and up to 30 percent of another polymerizable mono-olefinic compound, said resin containing from 0.05 to 10 percent by weight based on polymer content, of compound of group consisting of amino-guanidine and salts of amino-guanidine. No. 2,410,775. Fred Cox and James Wallace, Jr., to Wingfoot Corp.

Removing polymerization inhibitor from normally gaseous monomeric substance comprises bubbling monomer containing inhibitor up through body of high-boiling solvent for inhibitor, leading off vapors of purified monomeric substance from surface of body of liquid and condensing vapors. No. 2,410,779. Albert Gracia to Wingfoot Corp.

Method and apparatus for molding three-dimensional shapes from drawings. No. 2,410,888. Otto Lucy to Murray-Lucy-Marvosh Co.

Combination in molding press having stationary platen and movable platen, of double acting ram connected with movable platen for clamping mold halves together; central axial bores extending into ram from opposite ends, booster plunger extending into one bore, double acting injection plunger reciprocable in other bore, and extending through movable platen, fluid source to supply actuating fluid to halves, etc. No. 2,410,909. Warren Tucker to H-P-M Development Corp.

Preparing lubricating oil solution of resin comprises reacting phenol containing alkyl side chain of five to eight carbon atoms and at least one replaceable hydrogen atom in its nucleus with hexamethylenetetramine in presence of solvent consisting of mineral oil of lubricating oil range at 110° to 150° C. for 4 to 20 hours until 10 to 75% of original nitrogen content of reactants is eliminated. No. 2,410,911. Jones Wasson and Warren Smith to Standard Oil Development Co.

Forming hollow plastic body consists in immersing explansible hollow core in mass of settable plastic in liquid state which, on immersion, will adhere to core, withdrawing core from mass and incorporating in hollow mold portion of core having plastic adhering thereto and expanding portion to form of mold all before plastic adhering to core sets. No. 2,410,936. Erich Gronemeyer and Samuel Cherba.

Sub-resinous polyesters having at least one free carboxyl radical, in which the radical derived from the alcohol of sub-resinous polyester is that of a di-(polyalkylene glycoxy) alkane in which the ankenyl radical is selected from aliphatic alkenyl radicals containing from 8 to 18 carbon atoms and the dicyclohexenyl dialkyl methanes in which each alkyl radical contains less than 3 carbon atoms, each polyalkylene glycoxy chain contains from 5 to 20 alkylene glycol radicals, and the alkylene radical is selected from ethylene and propylene, and the polycarboxy acid radical of sub-resinous polyester is that of polycarboxy acidic fractional ester of ricinoleic acid glyceride and has plurality of free carboxyl radicals. No. 2,411,029. Melvin De Groote and Bernhard Keiser to Petrolite Corp., Ltd.

*Processes and Methods

Separating unsaturated aliphatic hydrocarbons from mixed hydrocarbon stream containing such unsaturates by extractive distillation wherein mixed hydrocarbon stream is passed upward through absorber tower in countercurrent to descending stream of solvent composed of furfural containing dissolved water, bottoms product consisting of furfural rich in unsaturated hydrocarbon is withdrawn from absorber tower, etc. No. 22,811. Virgil Scarth to Phillips Petroleum Co.

Heating composition consisting of topped sulfate turpentine in liquid phase, contaminated with odor-imparting impurities at 60° C. to 156° C. for two to twenty hours while simultaneously passing air through composition, until odor has been improved. No. 2,409,614. Robert Collins to Hercules Powder Co.

Separation of substances of different specific gravity from mixtures, comprising means forming enclosure into which mixture is delivered, plurality of tubular members in enclosure disposed adjacent each other in spaced relationship and adjacent wall of enclosure and providing therewith plurality of passages through which mixture flows, baffle means secured to wall of enclosure extending toward space between tubular members for directing mixture flowing from passages into space, etc. No. 2,409,625. Robert Haase to Foster Wheeler Corp.

In manufacture of cement, improvements comprise reducing lime and clay materials to fineness so that at least 90% will pass through 100 mesh sieve, fluidizing fine powder by contacting with continuously flowing gas, etc. No. 2,409,707. Bruno Roetheli to Standard Oil Development Co.

Two-stage distillation of ortho-substituted ring compounds. No. 2,409,773. Daniel Luten, Jr., and Aldo De Benedictis to Shell Development Co.

Extractive distillation, improvement consists of preventing corrosion of equipment and polymerization of furfural used as selective solvent by adding alkaline material, selected from bicarbonates of alkali metals, at controlled rate and continuously to such furfural used as selective solvent and maintaining acidity of furfural in range of pH 4.0 to pH 5.2. No. 2,409,781. Valentine Mertz to Phillips Petroleum Co.

Reclaiming soiled solvent containing water-insoluble coloring matter and solvent consisting of 20 to 50% hydrocarbons and balance being selected from ketones, esters, alcohols, and mixtures thereof, consisting in adding to mixture of solvents quantity of water whereby separation into two layers is brought about, adding to top layer active carbon, agitating mixture, removing active carbon to obtain top layer material free from coloring matter, de-watering bottom layer by distillation. No. 2,410,034. Enrique Luaces to Chemical Developments Corp.

Separating toluene from mixture of toluene and paraffin hydrocarbons of similar boiling point comprises intimately contacting mixture with sulphur dioxide in extracting treatment, separating composite mixture into raffinate phase and primary extract phase, bringing primary extract phase without removal of sulphur dioxide therefrom into intimate contact with paraffin hydrocarbon having boiling point higher than toluene in washing treatment, etc. No. 2,410,166. Thomas Kimball to Sinclair Refining Co.

Fractionation process for removal of moisture and hydrogen sulfide from low boiling fraction of impure hydrocarbons steps comprising introducing impure hydrocarbons into fractionating column intermediate ends thereof, removing overhead by fractionation moisture and portion of hydrogen sulfide, withdrawing at least portion of partially purified low boiling fraction from fractionator at point slightly below impure hydrocarbon introduction point, caustic treating withdrawn partially purified low boiling fraction for removal of hydrogen sulfide, etc. No. 2,410,223. Harold Legatski to Phillips Petroleum Co.

Process for heat-treating loose bulk materials, comprises advancing stream of materials composed of particles relatively coarse in size through confined heating zone, simultaneously therewith advancing second stream of materials composed of particles ot finer size through separate heating zone, admixing with hot coarse materials immediately upon discharge from first-named heating zone quantities of unheated material of fine particle size, etc. No. 2,410,236. Warford Reaney.

Fluid-type catalytic cracking system comprises gas oil surge drum, regeneration system containing heat exchanger, steam generation system, means for passing gas oil from surge drum to heat exchanger in re-

* *Continued from Vol. 591, Nos. 4, 5, Vol. 592, Nos. 1, 2.*

generation system, means for passing hot gas oil from regeneration system heat exchanger to fractionation system heat exchanger, etc. No. 2,410,284. Robert Gunness and Joseph Jewell, one-half to Standard Oil Co., and one-half to The M. W. Kellogg Co.

Tacky composition of matter comprising 100 parts by weight of rubber-like polymer of diene hydrocarbon having admixed therewith 2 to 50 parts by weight of resinous product obtained by condensing single aldehyde in presence of condensation catalyst with crotonaldehyde-type of auto-condensation product of lower aliphatic ketone of 3 to 6 carbon atoms, which auto-condensation product contains at least 12 carbon atoms. No. 2,410,623. Seaver Ballard and John Perona to Shell Development Co.

Impregnating electrical apparatus with insulation material solid at normal temperature and pressure, comprises impregnating apparatus with insulation material, bringing material by application of heat and pressure to volume which is normal volume for material at normal atmospheric pressure and temperature, cooling impregnating material isochorically. No. 2,410,756. Berthold Springer.

Separating paraffinic hydrocarbons from solvent extracts of petroleum and from vulcanizable unsaturated hydrocarbon products obtained from petroleum refining residues, said extracts and products having boiling range as high as lubricating oils, comprising treating such material with heptane in combination with furfural, etc. No. 2,410,839. Fritz Rostler, Vilma Wilson and Hubert du Pont to Wilmington Chemical Corp.

Coagulation of Castilloa latex comprising treating untreated Castilloa latex with dilute NaOH in ratio of 15 parts of latex to one part of NaOH, and with acid substance to neutralize NaOH and coagulate rubber, heating to facilitate coagulation of rubber. No. 2,411,033. Tirey Ford to the Secretary of Agriculture of the United States of America.

*Rubber

Bonding completely cured metal-adherent rubber composition directly to cuprous alloy article of class consisting of brass and bronze articles, comprising providing cuprous alloy article with clean, continuously smooth polished surface; bringing untreated surface of cured rubber composition into direct contact with polished cuprous alloy surface; maintaining sufficient pressure at rubber-metal interface to insure intimate contact between rubber and cuprous alloy; applying heat to cause rubber to adhere to alloy surface. No. 2,409,759. Oakley Hosking to Composite Rubber Products Corp.

Making cured butadiene-styrene synthetic rubber articles exhibiting superior properties upon aging comprises forming article from composition comprising raw butadiene-styrene synthetic rubber, carbon black, from 0.5 to 0.75 part of sulfur per 100 parts of raw butadiene-styrene synthetic rubber, an accelerator in amount sufficient to permit development of maximum flex life before aging in curing time equivalent to 30 minutes at 280° F., curing article for period of time equivalent to at least 75 minutes at 280° F. No. 2,409,809. Lawrence Sperberg to Phillips Petroleum Co.

Apparatus for building pneumatic tire casings. No. 2,409,974. Walter Breth and Robert Wormald to The General Tire & Rubber Co.

Flexible sheet comprising initially porous fibrous fabric sized or impregnated by highly cohesive composition essentially comprised of the in situ vulcanized fluxed blend of broken-down rubber, admixed compatible resin adapted to increase cementing action upon fibres of fabric and in proportion of 25 to 400 parts per 100 parts of rubber, and self-vulcanizing organic accelerator of thiuram polysulfide type and activator therefor. No. 2,410,078. Waldo Kellgren to Minnesota Mining & Manufacturing Co.

Making rubber-like product comprises heating mixture of 1,3 butadiene and sulphur in closed vessel at 70° C. to 160° C. for one hour to 100 hours, relative proportions by weight of butadiene and sulphur in mixture being from 1 part of butadiene and 1 part of sulphur to 1 part of butadiene and 9 parts of sulphur. No. 2,410,595. Raymond Bacon and Rocco Fanelli to Texas Gulf Sulphur Co.

Alkylating natural rubber, consists in making dilute solution thereof in lower saturated liquid aliphatic hydrocarbon selected from isobutane and isopentane, introducing thereinto boron trifluoride in presence of small proportion of water and precipitated nickel catalyst at temperature of less than 100° F. and separating resultant alkylated product therefrom. No. 2,410,661. Walter Huppke to West Disinfecting Co.

Treating guayule rubber comprises heating it in dilute aqueous solution of caustic soda at 150° C. No. 2,410,780. Albert Gracia to Wingfoot Corp.

Treating guayule rubber which comprises heating it in dilute aqueous caustic soda solution at 150° C. then subjecting it to solvent treatment to extract residual resinous matter. No. 2,410,781. Albert Gracia and Henry Powers to Wingfoot Corp.

Preserving rubber comprises incorporating therein amide of N-aryl amino aryloxy acetic acid. No. 2,410,782. Albert Hardman to Wingfoot Corp.

*Specialties

Polish composition comprising synthetic wax obtained by interaction of ethylene with organic compound represented by formula ROR' wherein R and R' are free of olefinic unsaturation, etc. No. 2,409,683. Benjamin Howk, John Roland, and Harvey Hoehn to E. I. du Pont de Nemours & Co.

Denture cleaning composition comprising dry free flowing powder of following composition: sodium salt of 2,2' dihydroxy 3,5,6-3',5',6' hexachlorodiphenylmethane 0.5-2 parts, sodium perborate 5-10 parts, tetrasodium pyrophosphate 20-70 parts, sodium lauryl sulfo-acetate 1.5-5 parts, tricalcium phosphate 2-3 parts, and sodium chloride as diluent to make 100 parts total, all proportions by weight. No. 2,409,718. Foster Snell and Kurt Haeseler to Foster D. Snell, Inc.

Brush comprising graphite, shellac and 5% to 15% sulphur. No. 2,409,818. Hugh Wikle to Superior Carbon Products, Inc.

Purifying exhaust gases from internal combustion engines, comprises treating gases with agent consisting of 20% potassium chlorate, 20% manganese oxide, 20% iron oxide, 20% copper oxide, and 20% calcium carbide, to transform carbon monoxide into carbon dioxide, treating gases with absorbing agent consisting of 50% calcium oxide, 20% iron sulphate, and 30% caustic soda. No. 2,409,825. Bernardo Baringoltz.

Mothproofing composition containing dixylyl guanidine sebacate, the salt having resinous properties. No. 2,409,883. Vartkes Migrdichian to American Cyanamid Co.

Semiconducting composition comprising 5 to 18 parts by weight of finely divided natural anthracite coal having more than 1% and less than 10% volatile matter, from 2 to 15 parts by weight of gum arabic, from 5 to 25 parts by weight of monohydric alcohol having from 4 carbon atoms, ammonia ½ of 1% to enable good suspension to be produced and from 55 to 70 parts of water, the whole forming suspension. No. 2,409,893. Wesley Pendleton and Leslie Frost to Westinghouse Electric Corp.

Adhesive composition comprised of rubber, thermo-softening rubber-compatible resin adapted to produce tack, minor proportion of oil-soluble heat-advancing rubber-reactive phenol-aldehyde resin. No. 2,410,053. Richard Drew to Minnesota Mining & Manufacturing Co.

Transforming rubber to pressure-sensitive adhesive form usable as coating for adhesive sheets or tapes, comprises breaking down rubber until in pasty and sticky condition, afterwards vulcanizing rubber until it is more cohesive than adhesive but still tacky, vulcanizing being completed at this stage such that after-vulcanization and tack loss will not occur. No. 2,410,079. Waldo Kellgren to Minnesota Mining & Manufacturing Co.

Pressure-sensitive adhesive tape having unified paper backing member comprising flexible porous paper impregnated and unified by relatively non-tacky, non-hygroscopic copolymer of vinyl ester and neutral ester of ethylene-alpha, beta-dicarboxylic acid in which at least about half of carboxylic acid groups are esterified with saturated beta-alkoxyethanol, said copolymer having modulus of elasticity between 2½ and 25 megadynes per square centimeter. No. 2,410,089. William Lundquist and Waldo Kellgren to Minnesota Mining & Manufacturing Co.

Stabilizing propellant solution of pyrethrins in CCl_2F_2 which solution normally tends to precipitate waxes and fats in presence of iron at above −20° C. comprises steps of chilling solution to between −10° C. and −30° C. until wax precipitation has ceased and separating chilled solution from precipitate. No. 2,410,101. Joseph Park and William Rhodes to Kinetic Chemicals, Inc.

Hand cleaner comprising emulsion of white mineral oil and stearic acid in aqueous solution containing diethylene glycol stearate, diethylene glycol laurate and diethylene glycol. No. 2,410,168. Werner Kleinicke to The Johnson-March Corp.

Imparting permanent set to hair, comprises treating hair with sulphite solution at pH6 and temperature of 50° to 70° C. while maintaining hair in form which it is desired to render permanent. No. 2,410,248. John Speakman to Perm, Ltd.

Softening agents of general formula described in patent. No. 2,410,294. Ernst Korten.

Precipitable sizing material comprising mixture of substantial quantities each of protein-containing cereal flour, rosin and alkali silicate from group consisting of metasilicate and sesquisilicate. No. 2,410,357. Donald Pattilloch, one-half to Chemical Development, Inc., and one-half to George Fowler.

Disinfecting and preserving agent comprising 1-hydroxy-5,6,7,8-tetrahydronaphthalene having halogen substituent in 4-position. No. 2,410,497. Winfrid Hentrich and Wilhelm Kaiser.

Coated abrasive waterproof belt comprising backing consisting of layer of flexible resilient leather, having pore stopping sizing coat on one surface, waterproofed on outer surfaces, substantially single layer of abrasive grain on sized surface of leather, comprising substantial amount of diamonds, and grain bonding coat of cured phenol-aldehyde waterproof resin on sized surface of leather. No. 2,410,506. Henry Kirchner and Albert Ball to The Carborundum Co.

Hydraulic liquid having freezing point below minus 50° F. and comparatively small change in viscosity in temperature range between minus 40° F. and 200° F., consisting of trialkyl phosphate having dissolved therein 1% by volume of corrosion-resisting agent and 0.25% by volume of pour point depressant. No. 2,410,608. John Morgan to Cities Service Oil Co.

Gun grade caulking and glazing cement, consisting of asbestos fiber in form of aqueous paste, 1 pound, raw linseed oil, 2 quarts, pine tar, 1½ ounces, fine soft hair, ¼ ounce, and calcium oxide in sufficient amount, less than 5 pounds, to give gun extruding consistency. No. 2,410,612. Nordahl Rude.

Flushing oil for cleaning crankcases of internal combustion engines comprising, fraction from products of catalytic reforming of heavy naphtha, boiling in range 400° F. to 535° F. and exhibiting kauri-butanol value in excess of 100, in admixture with mineral lubricating oil. No. 2,410,613. Robert Ruthruff.

Composition for treating wooden containers for rendering walls thereof impervious to gasoline and other liquids, consisting of and in proportion of 8 pounds animal fat, 24 ounces concentrated lye, 1 pint glycerine, and 4 ounces gasoline. No. 2,410,645. Thomas Finley.

Composition suitable for dielectric purposes comprising by weight 20 to 60 parts of dinaphthyl sulfone and 80 to 40 parts of chlorinated diphenyl. No. 2,410,714. Frank Clark to General Electric Co.

Range of dielectric compositions consisting of 99 to 85 per cent of hydrogenated vegetable oil and 1 to 15 per cent of aromatic sulfone. No. 2,410,715. Frank Clark to General Electric Co.

Making cementitious material comprises mixing cement, fibered plaster, and water together in predetermined proportions to form paste, shaping paste into predetermined form and permitting it to set, surface-wetting set material, subjecting surface-wet material to action of oven heat of at least twenty-three hundred and fifty degrees Fahrenheit for fifteen minutes, etc. No. 2,410,761. Anthony Tropiano.

Plaster compound comprising 96 lbs., 60 lbs. silica white sand, 30 lbs. gypsum, 4 lbs. dry powder wheat paste, 2 lbs. dry beaten paper pulp, all being thoroughly mixed. No. 2,410,865. Haughton Brown, fifty-five per cent to Daniel Taylor, Jr., and forty-five per cent to Viola Taylor.

Treating fur on pelt which includes combing in presence of moisture and heat and in atmosphere of helium. No. 2,410,898. Attilio Pierini.

Hydraulic cement modified by intermixture of three to five percent highly reactive silica in very minute particles obtained by cooling material in vapor phase which thereby forms silica in solid phase, said silica being amorphous and consisting of spherical particles of less than one micron diameter. No. 2,410,954. James Sharp to Permanente Cement Co.

Smoke producing composition comprising from 50% to 70% of oil-orange color, from 14% to 24% of inorganic salt which liberates oxygen on heating, from 14% to 24% of carbon-containing combustible material, and from 0.5% to 5% ammonium sulfate, amounts being by weight. No. 2,411,070. Joseph Van Karner.

Scale-peptizing composition comprising solid comminuted quebracho extract of at least 60% tannin content, particles of extract having adsorbed film of castor oil in amount of 0.4 to 0.6 part by weight of oil per part of extract. No. 2,411,074. Samuel Kinkelmann and John Wright to The Texas Co.

Preparing detergent composition containing by weight 5%-25% tall oil, 25%-45% of alkali metal subsilicate capable of saponifying oil, at least 5% of alkali metal phosphate and 25%-75% of bentonite comprises mixing oil and clay to cause absorption of oil by clay and admixing alkali metal subsilicate, wherein admixing of subsilicate is effected during cooling, further cooling product formed. No. 2,411,090. Edwin Garverich and William Martin to The Pennsylvania Salt Manufacturing Co.

*Textiles

Mop yarn consisting of core yarn having surface coating of substantial thickness intimately bonded thereto and completely surrounding core yarn for its entire length, coating consisting of cellulose sponge mass bonding fibers of core yarn together. No. 2,409,660. Walter Briggs.

Preparation of laminating fabric, comprises applying to fabric containing yarns of thermoplastic material having basis of organic derivative of

* *Continued from Vol. 591, Nos. 4, 5, Vol. 592, Nos. 1, 2.*

cellulose and non-thermoplastic yarns, aqueous dispersion of triethyl citrate. No. 2,409,703. Arthur Lyem to Celanese Corp. of America.

Preparation of laminating fabric, comprises applying to fabric containing yarns having basis of thermoplastic organic derivative of cellulose and yarns having basis of non-thermoplastic material, plasticizing mixture containing plasticizer for thermoplastic organic derivative of cellulose, alcohol and from 5 to 10% by weight of plasticizing mixture of water. No. 2,409,704. Arthur Lyem to Celanese Corp. of America.

Method of handling moisture-laden artificial fibers comprises subjecting fibers in form of web to disintegrating operation to loosen fibers, opening loosened fibers, continuously projecting opened fibers into current of hot air, etc. No. 2,409,747. Herman Folmer to American Viscose Corp.

Preparing stabilized fabric suitable for shirting and launderable dress goods having appearance, feel and draping qualities of shirting and like fabrics composed of pure spun rayon, comprises interweaving filling yarns consisting of pure spun rayon with warp yarns consisting of blend of from 40% to 60% rayon staple and from 60% to 40% cotton staple, etc. No. 2,409,894. Edward Pfeffer, Jr., and John Tweed and Jack Jarmak to Cluett, Peabody & Co., Inc.

Apparatus for directly converting tow to top while maintaining substantial parallelism of fibers and continuity of tow and sliver. No. 2,410,307. Joseph Rumsey to E. I. du Pont de Nemours & Co.

For use in combination with wheel over and about which yarn passes plurality of times, freely rotatable snubber roller, about which yarn passes between each successive pass around wheel. No. 2,410,419. James Bellezza, Jr., to E. I. du Pont de Nemours & Co.

Apparatus for manufacture of synthetic yarn. No. 2,410,456. Herbert Naumann to North American Rayon Corp.

Production and packaging of thread by method which includes forming thread, leading thread continuously over plurality of separate rotary treating devices in succession spaced at distance from each other but constituting unitary continuous spinning apparatus on which thread is subjected to successive treatments for ultimate collection in treated final form in package. No. 2,410,673. Herbert Naumann to North American Rayon Corp.

Device for twisting a strand comprising at least one pair of axially spaced coaxial fliers through air space between which strand is adapted to travel in free flight, one of fliers of each pair being idler, means for rotating other flier of each pair, rotatable support for strand mounted coaxially with intermediate of spaced members of each pair of fliers, means for traversing at least one of fliers adjacent one end of support with respect to support. No. 2,410,674. Seddon Nelson to American Viscose Corp.

In machine for fabricating welded wire fabric, plurality of pairs of welding wheels, means for feeding wire strand between wheels of each pair, pairs of welding wheels in alignment on line extending at right angles to strands, etc. No. 2,410,766. Theodore Wickwire, Jr., to Theowick Co.

Cord made of core of textile material and coating on core comprising mixture of from 4 parts to 32 parts of synthetic rubber latex solids, from .5 part to 10 parts of protein and from 1 part to 16 parts of one of group consisting of aromatic hydroxy compounds and their salts. No. 2,410,792. Theodore Ten Broeck to Wingfoot Corp.

Production of crepe effects on fabrics comprising yarns containing filaments of organic derivative of cellulose which have been crepe twisted while subjected to action of hot aqueous fluid, comprises treating fabrics with hot aqueous creping bath to which has been added small amount of lower aliphatic acid. No. 2,410,867. Cyril Croft and William Cramer, Jr., to Celanese Corp. of America.

Composite fabric comprising open texture web of heterogeneously distributed strands saturated with and bonded together at intersections thereof by thermoplastic binder and another web of loosely arranged unspun long fibers that are bonded together by non-thermoplastic binder that is non-compatible with thermoplastic binder that is non-compatible with thermoplastic binder, and that are bonded to strands of first web to form integral tough sheet. No. 2,410,884. Beardsley Lawrence, Jr., to Utility Fabrics Co., Inc.

Funnel for spinning rayon, comprising outer tubular member formed of at least two portions mating longitudinally, each of portions having plurality of similarly disposed annular recesses, plurality of thread-guiding inserts positioned in and spaced by recesses in assembled relation of parts, substantially conical mouthpiece having depending sleeve for containing and holding together upper ends of portions, tip insert having external flange, etc. No. 2,411,049. Leo Madden to Skenandoa Rayon Corp.

Producing straight, compact twisted rayon yarn which, when tested by conventional twist-testing methods, shows twists in one direction only, comprises subjecting rayon yarn to twisting operation in one direction to produce twist of from 3% to 60% in excess of desired finished twist, setting twist, etc. No. 2,411,132. Berkeley Hathorne and Robert Seem, to Crepe de Chine, Inc.

*Water, Sewage and Sanitation

Water meter comprising hollow ferrous body including openable ferrous frost plate secured to bottom of body, measuring chamber made of rust-proof metal, top and side contact surfaces in body for accurate fit and location of measuring chamber within body, contact surfaces of soft, rust-proof liners secured to meter body, rust-proof paint coating body and frost plate. No. 2,410,852. Alexander Whittaker to Rockwell Manufacturing Co.

Agricultural

In propagation of plants method of altering growth characteristics of plant comprises treating plant structure with compound selected from class consisting of free carboxylic acids and compounds which on hydrolysis yield said acid, said acid being a carboxylic acid having the formula described in patent. No. 2,411,359. John Billman.

Refining crude oleoresin containing iron compounds comprises dissolving oleoresin in turpentine, mixing oleoresin solution with a 1 to 2 normal solution of mineral acid at 70° until iron compounds are dissolved out, separating and washing out acid solution from oleoresin solution and distilling off turpentine. No. 2,411,925. Ray Lawrence to Secretary of Agriculture of the United States of America.

Defoaming composition for sugar syrup comprising fatty acid of vegetable oil origin, fatty acid being free of glycerine and obtained by removal from foots resulting from refining of vegetable oil by treatment with alkali and subsequent acidulation with sulphuric acid, together with an unsaturated extract oil of mineral oil origin. No. 2,412,276. Rudolph Larsen to Fred Bresse, Jr., as "Balab".

Gelatin product containing fumaric acid as acid ingredient. No. 2,412,305. William Stokes and Margaret Kennedy to Standard Brands, Inc.

Producing wooden article comprises plasticizing slender wooden blank in which grain of the wood runs longitudinally, and axially rolling blank between heated forming rolls which are of similarly varying longitudinal contour, and are caused to approach each other gradually during rolling operation whereby blank is densified in varying degrees at different points in its length and becomes set as solid of revolution of varying cross section in which degree of densification varies in inverse relation to cross section. No. 2,412,523. Carl Lundstrom.

Biochemical

Increasing normal vitamin B_1 and riboflavin content of live, wet brewer's yeast comprises maintaining said yeast, in presence of limited food supply, at temperature between 32 degrees F. and 50 degrees F. for period of not less than week, whereby there is brought about increase of at least 50% in vitamin B_1 content and increase of corresponding character in riboflavin content. No. 2,411,445. Ben Maizel to Vico Products Co.

Cellulose

Molding composition comprising cellulosic derivative resulting primarily from treating cellulosic ether free from hydroxyl content under pressure with hydrogen until at least 15% hydrogenation results and condensing mass with alcohol and olefin having molecular weight from 84 to 112, etc. No. 2,411,666. Jean Monier.

Treating cellulose fibres, comprises impregnating fibres with formaldehyde solution having formaldehyde content of less than 10% but more than 2% in presence of acid catalyst, etc. No. 2,411,818. Ernst Weiss to Heberlein Patent Corp.

Canadian

Preventing deterioration of cellulosic materials in the presence of heated air-blown asphalts by providing about 5 per cent of oil-soluble lead soaps and finely divided lead oxides at the surface of contact. No. 438,884. California Research Corporation (William H. Hampton and Vaughn R. Smith).

Ceramics

Device for applying ceramic color to surface prepared with adhesive coating comprising support for object having such prepared surface, applicator adapted to be engaged with ceramic color applied to coating, means for bringing applicator and applied ceramic color in contact, means for restraining support against vibration, means for vibrating applicator in all directions. No. 2,411,269. Eugene Hardesty to Fuller Label & Box Co.

Apparatus for use in manufacture of tempered glass comprising plurality of open ended tubes, supporting means for supporting tubes with one end of each adjacent the glass sheet to be tempered, means including header communicating with one end of each tube for forcing cooling fluid through tubes and against one face of glass sheet, actuating means including automatically reversible means connected with tubes for alternately moving tubes toward and away from glass sheet. No. 2,411,701. Theodor Weihs, by judicial change of name Theodore White, to American Window Glass Co.

Forming mirror having effective reflectivity to produce adequate clear reflected image and also producing visually effective color by light ray interference in continuous partially transparent light reflective metallic sulfide film inherently capable of producing color by light ray interference. No. 2,411,955. William Colbert and Willard Morgan to Libbey-Owens-Ford Glass Co.

Canadian

Process of making a glass composition which is highly resistant to attack by hydrofluoric acid. No. 439,174. American Optical Company (Alexis G. Pincus).

Ceramic dielectric composition which comprises calcium titanate and an alkaline earth stannate. No. 439,228. The Titanium Alloy Manufacturing Company (Eugene Wainer).

Glass-to-metal seal in which the glass consists of approximately 67-67 .5 per cent, SiO_2, 15-16 per cent B_2O_3, 7.5 per cent Al_2O_3, 1-3 per cent Na_2O, 3-5 per cent K_2O, 1 per cent Li_2O and 3 per cent BaO. No. 439,321. Corning Glass Works (Robert Hennah Dalton).

Coatings

Coating, comprising applying resin-free coating including hydrated ferric oxide and vehicle oil containing fatty acid glyceride, heating coating to from 500 to 690° F. for time changing the color of ferric oxide and dehydrating same. No. 2,411,192. Howard Copthorne to United States Steel Supply Co.

Coating process for interior of tubular member consisting of three simultaneous operations, moving nozzle, from which coating material is ejected, longitudinally of and in one direction in proximity to interior surface of tubular member being coated, forcing coating material from nozzle commensurate with, and controlled in amount by, movement of nozzle, spinning tubular member and centrifugally spreading material in direction transverse to movement of nozzle. No. 2,411,250. George Evans to Westinghouse Electric Corp.

Liquid coating composition comprising paint consisting of 45% pigment and 55% of vehicle composed of 82% unsaturated fatty acid modified alkyd resin and solvent therefor, and texturing material composed of finely divided material consisting of fibrous material combined with thermoset phenol formaldehyde resin. No. 2,411,554. Michael Riccitiello to Westinghouse Electric Corp.

Lacquer base comprising unsaturated cellulosic derivative resulting primarily from treating cellulosic ether free from hydroxyl content under pressure with hydrogen until at least 15% hydrogenation results and then condensing mass with alcohol and an olefin having molecular weight from 84 to 112 subsequently dehydrogenating mass by refluxing at temperature equal to highest boiling temperature of alcohol until it becomes unsaturated, etc. No. 2,411,665. Jean Monier.

In vacuum evaporating device for producing thin films on surface of an object, holder for object, three elongated evaporating elements equidistant from and in opposed relation to holder, arranged symmetrically along sides of equilateral triangle, foraminous screen in form of equilateral triangle placed between evaporating elements and holder for procuring uniform thickness of evaporated material over whole surface of object, etc. No. 2,411,715. Glenn Dimmick to Radio Corp. of America.

Bodying vegetable drying oil selected from group consisting of tung oil and crude oiticica oil consists in exposing oil to light consisting essentially of infrared radiations of such intensity whereby time required to obtain given degree of body is reduced. No. 2,411,767. William Waldie and Harry Toulmin, Jr., to New Wrinkle, Inc.

Roller-type applicator for coating materials, covering for roller comprising

* *Continued from Vol. 591, Nos. 4, 5, Vol. 592, Nos. 1, 2.*

pile fabric having cushioning layer of sponge rubber united to back thereof. No. 2,411,842. Richard Adams to The Sherwin-Williams Co.

Manufacturing improved drying oils from semi-drying oils comprises heating mixture comprising major proportion of semi-drying oil with from 1 to 7 per cent on weight of oil of polyhydric alcohol until reaction is complete and esterifying reaction product with 1 to 7 per cent on weight of oil of polybasic acid of class consisting of polycarboxylic acids and their anhydrides, to form oil of low acid number. No. 2,412,176. Alexander Schwarcman to Spencer Kellogg & Sons, Inc.

Manufacturing improved drying oils capable of bodying rapidly to fast drying product, comprises heating fatty oil having drying properties with 1 to 7 per cent on weight of oil of polyhydric alcohol until reaction is complete and esterifying reaction product with 1 to 7 per cent on the weight of oil of polybasic acid of class consisting of polycarboxylic acids and their anhydrides, to form oil of low acid number. No. 2,412,177. Alexander Schwarcman to Spencer Kellogg & Sons, Inc.

In process of coating hydrophilic aggregate with asphalt, wherein oil-in-water emulsion of asphalt is applied to aggregate, improvement comprising applying to aggregate an oil-in-water emulsion of asphalt containing small amount, sufficient to increase adhesiveness of asphalt to aggregate, of alkali metal dichromate. No. 2,412,526. Paul McCoy to American Bitumuls Co.

Article of manufacture having zinc surface with thin, adherent, continuous coating containing chromium and PO_4, formed by drying said surface acidic solution consisting of water, compound containing hexavalent chromium, and compound containing PO_4, coating being insoluble in water and containing some unreacted chemical. No. 2,412,543. Robert Tanner to Parker Rust Proof Co.

In coating hydrophilic aggregate with bitumen which normally lacks capacity to adhere strongly to hydrophilic aggregate in presence of water, wherein bitumen in form in which it is in continuous phase is applied to aggregate, improvement comprising applying to aggregate bitumen containing small amount, sufficient to increase adhesiveness of bitumen to aggregate, of alkali metal salt of oxy-acid of chromium. No. 2,412,545. Vilas Watts to American Bitumuls Co.

Dyestuffs

Anthraquinone dyestuffs containing in 1-position a hydroxyalkylamino group esterified with an organic acid radical and in 4-position a hydroxyalkylamino group. No. 2,411,148. Joseph Dickey and James McNally to Eastman Kodak Co.

Manufacture of disazo dyestuff, comprises coupling, with 8-hydroxyquinoline capable of coupling, diazotized aminoazo compound of formula described in patent. No. 2,411,646. Walter Anderau to Society of Chemical Industry in Basle.

Cellulose acetate materials colored with 4-chlor-2-nitro-4'-alkoxy-azobenzene free from salt-forming groups. No. 2,412,312. Christopher Argyle to British Celanese, Ltd.

Canadian

Trinuclear polymethine dye. No. 439,182. Canadian Kodak Company, Ltd. (Leslie G. S. Brooker and Frank L. White).

Carbocyanine dye. No. 439,183. Canadian Kodak Company, Ltd. (Leslie G. S. Brooker and Robert H. Sprague).

Quaternary salt and dye. No. 439,184. Canadian Kodak Company, Ltd. (Leslie G. S. Brooker).

Equipment

Apparatus for dialysis of solutions comprising chamber, multiplicity of tubular dialyzing membranes comprising outer tubes of relatively large diameter and tubes of relatively small diameter in tubes of large diameter, means spaced within chamber supporting tubular dialyzing membranes, means to pass solution to be dialyzed through outer tube into contact with one surface of inner tube, means to pass another liquid through inner tube into contact with other surface of inner tube, means to continuously concentrate solution being dialyzed so as to increase rate of dialysis. No. 2,411,238. Justin Zender to Sylvania Industrial Corp.

Apparatus for dialysis of liquid solutions comprising chamber, means of dialysis comprising dialyzing membrane in form of tube disposed therein, means for continuously circulating solution to be dialyzed in contact with one surface of tube, means for passing another liquid into contact with other surface of tube, means for concentrating dialyzate after passage through dialyzing tube, means for recirculating concentrated dialyzate through tube. No. 2,411,239. Frank Reichel and Arthur Russell to Sylvania Industrial Corp.

In filtering apparatus, filtering unit comprising central frame having open sides, discharge nipple carried by and opening into frame, nipple comprising means for suspending unit in position, perforated plates clamped to frame covering open sides, screening laminations clamped between adjacent perforated plates covering open sides of frame. No. 2,411,341. Frank Shepard.

Tank for liquid clarification comprising flat, circular tray concentrically and horizontally installed between bottom and top of tank, spaced from wall of tank, having central opening, to form flocculation compartment below tray, clarification compartment above tray, continuous, annular, peripheral flow channel between compartments, etc. No. 2,422,386. Henry Parker and Frank Prager to Graver Tank & Mfg. Co., Inc.

In liquid treatment tank, bottom having flat circular top surface for uniform accumulation of settled sludge, side wall upstanding from peripheral part of bottom, annular baffle downwardly extending in tank to define channel outside baffle and clarification chamber inside same, baffle so located that channel has considerably less area than chamber, and baffle terminating above bottom so that lower part of channel communicates with lower part of chamber, etc. No. 2,411,390. Frank Prager to Graver Tank & Mfg. Co.

X-ray exposure calculator having in combination plurality of relatively movable, disk-like members including base member, first movable member, transparent member and top movable member superimposed upon base member in order stated; base member having at one side milliampere-seconds scale and at opposite side, scale denoting character of subject to be radiographed, etc. No. 2,411,491. William Williams to General Aniline & Film Corp.

Thermoplastic pipe flange to be joined by means of bolts to complementary flange, first flange having central bore and working face, inner portion of which adjacent bore is plane perpendicular to axis of bore and outer portion of which is inclined in direction of body of flange at angle of 1° to 5° from plane surface. No. 2,412,487. Oliver Amley and John Gregory to The Dow Chemical Co.

Explosives

High explosive ingredient consisting of nitrated solid compound resulting from nitration of oil-free, undenaturate solid product of commercial solvent extraction of oil from edible-oil group of oil bearing seeds. No. 2,411,145. Michele Bonotto to Dorothy Di Frasso.

Explosive composition comprising cyclotrimethylenetrinitramine and between 0.1% and 4.0% of organic base having dissociation constant lower than 1×10^{-5}. No. 2,411,604. Milton Wahl to E. I. du Pont de Nemours & Co.

Food

Treating fatty material to improve at least selected one of its characteristics of flavor, color and odor, comprising intimately mixing fatty material with at least one oil-free juice selected from olive juice and coconut juice, effecting separation of juice and treated fatty material. No. 2,411,201. John Forkner.

Inorganic

Production of zirconium hydride consisting of mixing zirconium oxide with magnesium chips or powder in molal proportions with limited excess of magnesium, etc. No. 2,411,524. Lewis Davis to Metal Hydrides, Inc.

Removing soda from alumina, comprising leaching alumina with hydrofluoric acid solution, leaching said alumina with solution of another acid, said leaching operations being continued for time insufficient for said solutions to react with all of alumina. No. 2,411,806. August Riesmeyer and Walter Gitzen to Aluminum Co. of America.

Removing soda from alumina precipitated from solution containing dissolved sodium compound comprising leaching alumina with solution containing hydrofluoric acid and another acid. No. 2,411,807. August Riesmeyer to Aluminum Co. of America.

Preparing silica-containing catalyst comprises steps of neutralizing aqueous alkali metal silicate solution by addition of acid to form aqueous slurry of gelatinous silica containing alkali metal salts, aging slurry, adding glue to flocculate silica, separating alkali metal salts by dewatering and washing. No. 2,411,820. Kenneth Ashley and Alphons Jaeger to American Cyanamid Co.

Catalyst consisting of 1 to 15% beryllia, 1 to 10% of an oxide of metal selected from left-hand column of the sixth group of the periodic table and remainder an "activated alumina". No. 2,411,829. Hal Huffman to Union Oil Co. of California.

Making aqueous salt solution comprising continually introducing water into bed of finely divided salt in dissolver at multiplicity of points distributed uniformly near bottom surface and over entire cross sectional area of bed to form supernatant salt solution above bed, etc. No. 2,412,106. Edward Swartz.

Producing calcium sulfate hemihydrate from wet gypsum containing 12% of free moisture comprises mixing two parts by weight of wet gypsum with one part of hot, freshly calcined calcium sulfate hemihydrate to remove all free moisture in gypsum, calcining resulting dry gypsum at 300-400° F. to produce hot calcium sulfate hemihydrate, returning portion of hot calcium sulfate hemihydrate to mixing step. No. 2,412,170. John Peter to American Cyanamid Co.

Purifying anhydrous liquid halide of metal of fourth periodic group of elements comprises dispersing small quantity of alkali metal soap therein, vaporizing halide and condensing halide vapors. No. 2,412,349. Bernard Meyers to Pittsburgh Plate Glass Co.

Recovering bromine and iodine from natural brines consists in treating raw brine with excess chlorine sufficient to liberate major bromine content of brine and to give spent brine pH of approximately 1.1, lowering surface tension of brine by agitating it whilst it is moving in flowing stream and simultaneously passing current of air through flowing stream of brine under agitation, etc. No. 2,412,390. John Cranston.

Treating solid body to render it water-repellent comprises contacting body with composition containing as active ingredient thereof, mixture consisting of from 2.8 to 99.2 per cent by weight of trimethyl silicon chloride and 97.2 to 0.8 per cent by weight of silicon tetrachloride based on weight of mixture. No. 2,412,470. Francis Norton to General Electric Co.

Canadian

Process of separating atmospheric air into oxygen and nitrogen products. No. 438,974. William Lane de Baufre.

In the production of alkali metal chlorites absorbing chlorine dioxide in an aqueous solution containing hydrogen peroxide and the alkail metal bicarbonate. No. 439,059. The Mathieson Alkali Works (Edward C. Soule).

In the production of chlorine dioxide reacting a metal chlorate with a mineral acid of pH not exceeding 1 in the presence of hydrogen peroxide at a temperature approximating 40°-60° C. No. 439,060. The Mathieson Alkali Works (Edward C. Soule).

In the production of chlorine dioxide, reacting a chlorite of an alkali metal with a persulphate of an alkali metal in the presence of water at a pH between about 3 and 11. No. 439,061. The Mathieson Alkali Works (Clifford A. Hampel and Maurice C. Taylor).

Preparing a catalyst by precipitating carbonates of nickel and copper upon an inert carrier and reducing. No. 439,181. The Best Foods (Canadian), Ltd. (The Best Foods (Canada) Ltd., Toronto, The Best Foods, Inc., New York City, Casimer J. Borkowski and Jacob L. Schille).

Hypochlorite composition comprising lithium hypochlorite containing less water than is present in lithium hypochlorite monohydrate. No. 439,209. The Mathieson Alkali Works (Homer L. Robson and Edward C. Soule).

Producing elemental sulphur by contacting hydrogen sulphide and sulphur dioxide with an aqueous solution containing an alkali metal sulphite. No. 439,270. Marvin J. Udy.

An improved method of recovering chlorine from gas mixtures containing the same by adsorption on silica gel. No. 439,333. The Mathieson Alkali Works (Robert B. MacMullin).

Method of recovering chlorine from gas mixtures containing the same by adsorption on silica gel. No. 439,334. The Mathieson Alkali Works (Robert B. MacMullin).

Producing phosphoric acid, the step of treating an anhydrous acidic phosphatic material containing CaO and P_2O_5 with phosphoric acid to produce metaphosphoric acid and calcium metaphosphate. No. 439,354. Southern Phosphate Corporation (John H. Coleman).

Medicinal

Isolating pure dehydrocholic acid from mixture containing substantial proportion of same, comprising dissolving mixture in tertiary aliphatic alcohol at temperature in the neighborhood of boiling point of alcohol, separating hot solution from undissolved materials, lowering temperatures of solution to crystallize therefrom dehydrocholic acid. No. 2,411,169. Robert Sifferd to Armour & Co.

Reacting 17 - ethenyl - 17-hydroxy-perhydrocyclopentenophenanthrene with anil-forming aromatic amine in presence of mercuric-compound catalyst. No. 2,411,172. Homer Stavely to E. R. Squibb & Sons.

Treating 7-hydroxy-sterol di-ester with sodium methylate. No. 2,411,177. Oskar Wintersteiner and William Ruigh to E. R. Squibb & Sons.

N'-acylsulfanilamides of formula described in patent. No. 2,411,495. Max Dohrn and Paul Diedrich to Schering Corp.

Stable, supersaturated aqueous solution of saccharide derivative of suprarenal cortical hormone series containing, as hydrotropic agent, physiologically inert proportion of a saccharide, said hydrotropic agent being present in concentration sufficient to effect stabilization of solution but not exceeding 20-25%. No. 2,411,631. Karl Miescher and Charles Meystre to Ciba Pharmaceutical Products, Inc.

Stable medicinal preparation consisting of at least partially dried crystalline ferrous sulfate containing maximum of four moles of combined water closely mixed with at least one-fourth of its weight of ascorbic acid. No. 2,411,636. Ernst Preiswerk to Hoffmann-La Roche, Inc.

Clear aqueous solution comprising amino acid and stabilizing amount of wholly organic hydrophilic protective colloid, said solution adapted for injection into human body characterized by property of remaining free of insoluble matter for longer period during storage than does solution of amino acid identical therewith but containing no wholly organic hydrophilic protective colloid, etc. No. 2,411,897. Melville Sahyun to Sterling Drug, Inc.

Synthetic tocopherol, which is racemic at the C atom in position 2 of chromane ring, of formula described in patent. No. 2,411,967. Paul Karrer and Otto Isler to Hoffmann-La Roche, Inc.

Preparation of synthetic dl-tocopherols. No. 2,411,968. Paul Karrer and Otto Isler to Hoffmann-La Roche, Inc.

Preparation of synthetic dl-tocopherols. No. 2,411,969. Paul Karrer and Otto Isler to Hoffmann-La Roche, Inc.

7,8-dimethyl tocol and process for preparation. No. 2,411,970. Paul Karrer and Otto Isler to Hoffmann-La Roche, Inc.

Treating aqueous solution of "free" fraction from species of Erythrina comprising "free" individual alkaloids with sodium hydroxide, extracting alkaline solution with chloroform, acidifying aqueous alkaline solution remaining after extraction, heating to reflux acidified solution, treating with sodium bicarbonate, extracting weakly alkaline solution obtained with chloroform, recovering from last-mentioned chloroform extract alkaloidal substance, "erythroidine", a stereoisomeric mixture of formula $C_{16}H_{19}NO_3$. No. 2,412,256. Karl Folkers and Randolph Major to Merck & Co., Inc.

Fat-soluble vitamin B_6 preparations essentially consisting of therapeutically pure acetyl derivatives of vitamin B_6 in pure form. No. 2,412,272. John Keresztesy and Joseph Stevens to Merck & Co., Inc.

Synthesis of ethers of vitamin A. No. 2,412,465. Nicholis Milas to Research Corp.

Canadian

Method of making isopropenylvinyl ether suitable for use as an inhalant anaesthetic. No. 439,163. Air Reduction Company, Inc. (Amos G. Horney, Euclid and Julius G. Shukys).

Metallurgy, Ores

Buoyant element comprising rigid solid porous metallic sponge, having apparent density less than that of water, composed of reaction product of resinous material containing acidic component with powdered light metal reactive therewith, metallic sponge filling normally impermeable and rigid closed casing member. No. 2,411,202. Henry Gardner.

Recovering heavier than water mineral concentrates from concentrate-containing froth produced by flotation cell, comprises placing permeable filter with its lower surface in contact with undiluted froth, applying suction to upper side of filter causing concentrates to adhere to underside of filter, removing filter from froth applying gas under pressure to upper side of filter to discharge concentrates. No. 2,411,288. Albert Morse.

Apparatus for use in melting and spraying of metal and the like, comprising outer tubular housing, inner tubular member having nozzle at one end, means for feeding metal into inner tubular member toward its nozzle end, hollow tubular induction heating coil disposed around inner tubular member and enclosed within tubular housing, source of cooling gas under pressure, etc. No. 2,411,409. William Ballard to Metallisation, Ltd.

Producing highly polished surfaces on corrosion-resistant chromium steels, consists in making steel an anode in aqueous electrolyte consisting of 80% by volume of phosphoric acid of 85% grade, together with 15% by volume of 60° Baume sulphuric acid, and 5% by volume of soluble pyridine compound, providing suitable cathodes to assure uniform current flow from all parts of steel anode, passing current through resulting cell of density and for length of time to effect polish on steel surface. No. 2,411,410. Glenwood Beckwith to The American Steel & Wire Co. of New Jersey.

Roughening surface of low carbon steel having carbon content no greater than 0.5% with mixture of concentrated sulphuric acid and aqueous solution of nitric acid, normality of solution being between 0.5 and 6 and quantity by volume of concentrated sulphuric acid based on volume of solution being no greater than 0.2%. No. 2,411,532. Charles Escoffery to Federal Telephone & Radio Corp.

Selenium element having counter electrode coating of alloy of bismuth, lead and tin, bismuth being approximately one half of composition by weight. No. 2,411,560. Richard Speed to Federal Telephone & Radio Corp.

Electroplating comprises electro-depositing copper as bright, smooth, firmly adherent deposit from undivided cell containing aqueous electrolyte consisting of soluble copper salt and sufficient quantity of alkylene polyamine to form complex with salt, and compound selected from group consisting of lactic, citric and tartaric acids and alkali metal salts of such acids. No. 2,411,674. Ernest Wilson to Arthur D. Little, Inc.

Generating gaseous fuel for use in welding and cutting of metals, heating, hardening, and for like purposes, comprising spraying of propane with vapor of benzine and di-ethyl ether in following proportions by weight, 82 to 89% propane, 5½ to 9% di-ethyl ether, 5½ to 9% of benzine. No. 2,411,759. Louis Seley to Samuel White.

Pickling ferrous metals comprises subjecting metal to be pickled to action of sulfuric acid pickling bath containing as corrosion inhibitor alkylene thioglycol having between 2 and 5 carbon atoms. No. 2,411,791. Charles Hunt, John Olin and Harold Brandt to Sharples Chemicals, Inc.

Welding electrode of relatively soft material such as copper and reinforcing collar of cupreous metal of greater resistance to deformation than copper such as bronze, surrounding the tip of electrode and open at operating end to permit contact of copper with work. No. 2,411,859. Ralph Harwood.

Metal bonded abrasive comprising fine diamond particles having degree of fineness of the order of 40 to 100 microns and bond consisting of metallic platinum and electrolytically deposited metal in which diamond particles are embedded. No. 2,411,867. Bert Brenner.

Molding balls from moistened, finely divided ore material comprises providing supply of finely divided ore material having considerable range of particle sizes including large proportion of particles smaller than 44 microns diameter, and uniformly moistened with from 8 to 11 per cent by weight of water, maintaining adherent layer of uniformly moistened material against inside surface of rotary drum, continuously scraping formed layer to smooth even surface, feeding moist finely divided ore material in uncompacted form together with added discrete nuclei of uniformly moistened ore material onto layer, etc. No. 2,411,873. Charles Firth to Erie Mining Co.

In refining zinciferous lead with chlorine, improvement comprises providing elongated bath of molten lead of progressively decreasing zinc content, introducing chlorine into bath at spaced intervals of bath's length and forming on surface of bath molten slag of mixed zinc chloride content in direction of progressively increasing zinc content of bath, withdrawing molten lead from bath approximate the end of its minimum zinc content, withdrawing molten zinc chloride from bath approximate its other end. No. 2,411,940. William Shropshire to International Smelting & Refining Co.

Alloy containing .6 to 3% copper, .03 to .35% beryllium with remainder substantially all zinc. No. 2,412,045. Richards Harrington to General Electric Co.

Removing 0.001 to 0.005 inch of excess metal to dimensionally reduce to predetermined size and electro-polish an oversize metal article characterized by intercrystalline oxidation at surface thereof and made of composition from group consisting of nickel, nickel-base alloys containing copper, nickel-base alloys containing chromium and stainless steels containing nickel and chromium. No. 2,412,058. Leonard Pfeil to The International Nickel Co., Inc.

Apparatus for heat treating powder or small articles including furnace with external and internal structures leaving roughly annular space between them, heating means, annular retort with removable lid supportable in annular space, frame including tubular members, etc. No. 2,412,145. George Grene, one-half to Wild-Barfield Electric Furnaces, Ltd.

Polishing which includes steps of passing thru annular space between elongated stainless steel tube and cathode disposed axially therewithin polishing electrolyte which fills space and flows at rate sufficient to dislodge gases from inner surface of tube, and passing thru flowing electrolyte and between tube and cathode polishing current which is of uniform density on every unit area of inner surface of the tube. No. 2,412,186. Irving Whitehouse and Victor Chambers to Republic Steel Corp.

Beneficiation of chromium ores comprises agitating and aerating aqueous pulp of ore in presence of hydrofluoric acid, and long-chain fatty acid at pulp acidity of between pH 1.5 and pH 5.5, and separating chromium-containing froth as concentrate. No. 2,412,217. Richard Havens to the Secretary of the Interior of the United States of America.

Working and treating beryllium-copper alloys of cold workable-precipitation hardenable type to impart thereto cold workable structure capable of being repeatedly cold worked and recrystallized by heating to temperatures within range 750-1040° F. without substantial alteration in structure. No. 2,412,447. Matthew Donachie to Berks County Trust Co.

Concentrating sulphide ore comprises subjecting ore in form of pulp to froth flotation operation in presence of amyl xanthogen ethyl formate. No. 2,412,500. Arthur Fischer.

Canadian

Plating a mixture of metals by passing an electric current from a magnetite anode to a cathode through an aqueous ammoniacal solution of a mixture of metal-ammonia salts. No. 439,043. Indiana Steel & Wire Company (Richard H. Burns).

Dissolving vanadium from a vanadium oxide mixture by contacting the vanadium oxide mixture with aqueous oxygen-containing ammoniacal solution. No. 439,274. Allied Chemical and Dye Corporation (William Charles Cooper, Jr. and Alver Dunbar).

Electrode wire for electron discharge devices of a ductile alloy consisting by weight of the alloy of about .15 per cent carbon, about 2 per cent tungsten, about 1 per cent aluminum and the balance nickel. No. 439,348. Radio Corporation of America (Emil Gideon Widell).

Organic

Mixture of saturated organic tetrafluoroethyl compounds having the general formula described in patent. No. 2,411,158. William Hanford to E. I. du Pont de Nemours & Co.

Process for synthesis of alkenyl succinic anhydrides from maleic anhydride and cracked petroleum hydrocarbon mixtures containing mono-olefins, comprises distilling cracked petroleum hydrocarbon mixture to obtain product free from gums, oxygen compounds and water, mixing freshly distilled product with amount of maleic anhydride equivalent to 5% to 20% by weight of resulting mixture, etc. No. 2,411,215. Mearl Kise and Robert Engle to The Solvay Process Co.

Preparation of reaction products of alpha-beta-dihaloethers with dithiocarbamates comprises reacting alpha-beta-dihaloether with member selected from ammonium and alkali metal salts of dithiocarbamic acid. No. 2,411,219. Roger Mathes to The B. F. Goodrich Co.

3,4-dibromotetrahydrothiophene. No. 2,411,225. Wilbur Patterson and Joseph Karabinos to Wyeth Inc.

Preparing carbon-sulfur compounds comprises contacting paraffinic hydrocarbon gases with sufficient sulfur vapors to stoichiometrically react with gases to form mercaptans at temperature of at least 400° C., at which sulfur and hydrocarbon gases chemically react, in presence of catalyst selected from preformed metal sulfides. No. 2,411,236. Carlisle Thacker to The Pure Oil Co.

Making butadiene comprises passing mixture of ethylene and acetylene in molal ratio of from 10:1 to 50:1 through reaction zone, maintaining reaction mixture in zone at 871 to 881° C. under pressure of from 0.2 to 2 atmospheres, for from 0.14 second to 0.23 second, withdrawing reaction mixture from zone, recovering butadiene content thereof as product of process. No. 2,411,256. Frederick Frey to Phillips Petroleum Co.

Separating butenes-2 from mixture of butenes-2, C_5 and heavier hydrocarbons produced in manufacture of butadiene comprises feeding hydrocarbon mixture containing butenes-2 and heavier hydrocarbons to fractionating column and fractionally distilling therein, supplying to bottom of column heat in amount such that butenes-2 is incompletely removed from kettle product and maintaining reboiler section of column at such temperature that polymerization in fractionating column is prevented, etc. No. 2,411,264. Karl Hachmuth to Phillips Petroleum Co.

Reacting propylene and conjugated diolefin with sulfur monochloride to form mixture of chloroalkyl sulfides, treating mixture with aqueous solution of water-soluble polysulfide. No. 2,411,275. Ivar Kinneberg and Charles Thomas to Universal Oil Products Co.

Piperidinoethanolester of di-n-butyl acetic acid of formula described in patent. No. 2,411,283. Henry Martin and Alfred Margot to J. R. Geigy A. G.

Aromatic hydrocarbon amine of improved stability containing finely distributed 2,4-dimethyl-6-tertiary butyl phenol in amounts of .01 to 1% calculated on the amine. No. 2,411,307. Ernest Walters to Shell Development Co.

In removing from nitriles class consisting of propionitrile, normal buty-

ronitrile, and iso-butyronitrile, hydrocarbon impurities having boiling points such that in mixtures with nitriles they distill in same temperature range as nitriles, improvement comprises subjecting hydrocarbon-contaminated nitrile product to fractional distillation in admixture with acetonitrile, distilling off hydrocarbon-contaminant and acetonitrile as azeotrope. No. 2,411,346. John Teter and Walter Merwin to Sinclair Refining Co.

Preparing condensation products of sodium cyanamide and formaldehyde comprises reacting, as sole reactants, said compounds in equimolar proportions in aqueous alkaline reaction medium having pH above 9 and approximately the pH of aqueous solution of equimolecular proportions of sodium cyanamide and formaldehyde, temperature during reaction being maintained below 25° C. No. 2,411,396. Joseph Walker to E. I. du Pont de Nemours & Co.

Production of sodium cyanamide-formaldehyde condensation product comprises reacting, in aqueous solution and at temperature below 45° C., equimolecular amounts of monosodium cyanamide and formaldehyde, precipitating resulting product by addition of sufficient strong acid to reduce pH of mixture to between 8 and 9. The product obtained admixed with 1% to 10% by weight of polyvinyl alcohol having saponification number between 0 and 18. No. 2,411,397. Joseph Walker to E. I. du Pont de Nemours & Co.

Preparing reaction products having good color and good wetting-out properties comprises providing dilute aqueous solution of hydroxy-alkyl amine, maintaining solution at low temperatures, adding carboxylic acid acyl halide while preventing rise in temperature beyond 40 degrees C. neutralizing hydrohalic acid which forms during reaction. No. 2,411,434. Morris Katzman to The Emulsol Corp.

Apparatus for preparing alkyl lead compounds from alkyl halides and lead sodium alloys. No. 2,411,453. Frederick Mitchell, James Lawrence and Joseph Stecher to E. I. du Pont de Nemours & Co.

In manufacture of soap, process comprising continuously converting fat into soap by mixing fat vigorously with saponifying reagent at saponifying temperature during passage through mixing zone, graining soap resulting from mixing step, thereafter passing resulting mixture of grained soap and aqueous phase through aging zone in which mixture is churned by agitation of degree less than that maintained in preceding mixing zone, passing aqueous phase and grained soap into second mixing zone in which they are agitated more vigorously than in aging zone until uniform dispersion of soap is obtained, passing mixture resulting from agitation into centrifugal separator. No. 2,411,468. Leopold Sender to The Sharples Corp.

Manufacture of soap. No. 2,411,469. Leopold Sender to The Sharples Corp.

As new compound, acid-catalyzed addition-rearrangement product of aliphatic alcohol and adduct of cyclopentadiene with styrene, said product being ether of endoethylene-substituted phenyl cyclopentanol. No. 2,411,516. Herman Bruson to The Resinous Products & Chemical Co.

N-phosphatoarylenediamines. No. 2,411,527. Joseph Dickey and James McNally to Eastman Kodak Co.

Esterifying fatty acids contained in tall oil mixture of fatty acids and resin acids, comprises treating mixture consisting of tall oil and excess of low molecular weight monohydric aliphatic alcohol, in absence of catalyst, at superatmospheric pressure and temperature of from boiling point of mixture to 200° C. discontinuing reaction as soon as fatty acids are completely esterified and before esterification of resin acids begins. No. 2,411,536. Frederick Gayer and Charles Fawkes to Continental Research Corp.

Manufacture of anhydride of carboxylic acid, comprises heating carboxylic acid with liquid acetic anhydride in presence of organic liquid which does not enter chemically into reaction with carboxylic acid or its anhydride or acetic anhydride and which forms with acetic acid constant boiling mixture of minimum boiling point, removing acetic acid produced by reaction from reaction zone as reaction proceeds by distilling it off as constant boiling mixture. No. 2,411,567. James Fisher to British Celanese Ltd.

Process comprises condensing 1/5 to 5 mols of ether having general formula R-O-R', in which R and R' are alkyl groups having total of less than 10 carbon atoms, with about 1 mol of aromatic compound, in presence of ½ to 4 mols of a Friedel-Crafts catalyst and in presence of ½ to 10 volumes of inert solvent per volume of total reactants and catalyst, etc. No. 2,411,578. Eugene Lieber and Marvin Thorner to Standard Oil Development Co.

Preparing barium salts of carbocyclic-aliphatic ether alcohols. No. 2,411,586. John Morris to The Texas Co.

Separating diolefin from gas mixtures comprising diolefin, and acetylenes, comprising steps of absorbing diolefin, acetylenes, and olefins in selective solvent, stripping absorbed olefins from selective solvent by contacting it with mixture of diolefin and acetylenes, heating stripped solvent under conditions to release portion of diolefin in substantially pure form, heating solvent under conditions to release remainder of diolefin and appreciable acetylenes, using mixture of diolefin and acetylenes thus obtained as stripping medium in stripping step. No. 2,411,588. John Packie and William Craft to Standard Oil Development Co.

In catalytic dehydrogenation of olefins, improvement which comprises discharging preheated olefins into vertically disposed conversion chamber of restricted cross-sectional area, simultaneously discharging into chamber fluidized powdered catalyst material, causing powdered material to gravitate through foraminous member into regeneration chamber continuously disposed immediately below conversion chamber by regulating velocity of gas in conversion chamber to permit gravitation, etc. No. 2,411,592. Edward Reeves to Standard Oil Development Co.

Manufacture of N-(polyhydroxyalkyl)-arylamines. No. 2,411,611. Franz Bergel, Aaron Cohen and John Haworth to Hoffmann-La Roche Inc.

Manufacture of condensation products, comprises condensing thiourea compound of formula described in patent. No. 2,411,655. Charles Graenacher and Richard Sallmann to Society of Chemical Industry in Basle.

4-aminobenzene-sulfone-carbamic acid derivative. No. 2,411,661. Henry Martin and Alfred Staub to J. R. Geigy A. G.

An imino-di-fatty acid amide of formula described in patent. No. 2,411,662. Henry Martin and Hans Gysin to J. R. Geigy A. G.

Amino alcohols and method of preparing the same. No. 2,411,664. Karl Miescher and Adrian Marxer to Ciba Pharmaceutical Products, Inc.

Halogen substitution products of 8-hydroxy-quinaldine containing halogen in carbocyclic nucleus of general formula described in patent. No. 2,411,670. Emil Senn to J. R. Geigy A. G.

Oxidising acetaldol, by action of molecular oxygen at pressure greater than one fifth of an atmosphere and at temperature between 55° and 80° C. in presence of oxygen carrier catalyst whilst maintaining intimate

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contact between molecular oxygen and acetaldol solution, etc. No. 2,411,700. Karl Tuerck and Hans Lichtenstein to The Distillers Co., Ltd.

Dehydrogenation to aromatic hydrocarbons of corresponding hexamethylene naphthenes contained in mixture containing also at least one toxigen. No. 2,411,726. Ronald Holroyd and David Peel to Imperial Chemical Industries, Ltd.

In catalytic conversion of carbon monoxide and hydrogen into compounds of higher molecular weight by contact with solid synthesis catalyst, process comprises passing gaseous stream containing carbon monoxide and hydrogen downwardly through plurality of separate porous beds of synthesis catalyst in solid particle form in series and spaced a distance apart from each other within tower, disposing in spaces between catalyst beds porous bed of non-catalytic solid particles through which vapors pass flowing from upper catalyst bed to lower catalyst bed, etc. No. 2,411,760. Eugene Sensel to The Texas Co.

Preparing 9,10-epoxyoctadecanol, comprising reacting oleyl alcohol with a solution of perbenzoic acid in acetone at 0° C. to 5° C., permitting resulting solution to stand for 40 hours at room temperature, cooling solution to −25° C. to form precipitate which comprises mainly 9,10-epoxyoctadecanol. No. 2,411,762. Daniel Swern to the Secretary of Agriculture of the United States of America.

Dealkylating Mono-alkyl cyclic compound, comprises contacting mono-alkyl cyclic compound with catalyst comprising alumina as its essential active ingredient and hydrogen halide under dealkylating conditions of temperature, pressure and time, separating completely, dealkylated cyclic compound and hydrogen halide from resultant products, and recycling thus separated hydrogen halide to dealkylation step. No. 2,411,799. William Mattox to Universal Oil Products Co.

In purification of amine-containing reaction mixtures resulting from reaction of carbonyl compound chosen from class consisting of aliphatic aldehydes and ketones with aminating agents and hydrogen, process comprising mixing crude reaction mixture containing amine bases with aqueous solution of inorganic base and separating amine bases from resulting aqueous solution by distillation. No. 2,411,802. John Olin to Sharples Chemicals, Inc.

In process of separating normally gaseous hydrocarbon from water-miscible organic liquid and higher boiling hydrocarbon liquid immiscible in water in fractionation zone, said normally gaseous hydrocarbon being removed from upper portion of fractionation zone and hydrocarbon liquid being obtained in admixture with water-miscible organic liquid at lower portion of fractionating zone, improvement comprises adjusting dilution of water-miscible organic liquid with water in admixture to reject dissolved normally gaseous hydrocarbon substances therefrom, etc. No. 2,411,808. Walter Rupp and Richard Wright to Standard Oil Development Co.

Producing dry metal sulfonates of improved oil solubility from oil solution of sulfonates, comprises adding to solution an oil soluble high molecular weight hydrocarbon material which is insoluble in liquid propane at 190° F. in amount sufficient to improve substantially solubility of sulfonates, etc. No. 2,411,819. Earl Amott to Union Oil Co. of California.

Production of dimer of conjugated diolefin containing fewer than about 7 carbon atoms. No. 2,411,822. Thomas Doumani to Union Oil Co. of California.

Production of unsaturated ketones comprises reacting olefin with acid anhydride of saturated aliphatic carboxylic acid of not more than four carbon atoms in presence of catalyst comprising acetyl sulfoacetic acid. No. 2,411,823. Thomas Doumani and Joseph Cuneo to Union Oil Co. of California.

Preparing halo acetal comprises introducing elemental halogen selected from group consisting of bromine and chlorine into mixture of vinyl acetate and an alcohol. No. 2,411,826. Edward Filachione to Monsanto Chemical Co.

Preparing relatively water insoluble metal soap of organic acid which is also capable of forming relatively water soluble soap of second metal, consists in adding solid granular salt of first metal, with agitation, to water solution of water soluble soap of acid and said second metal so as to form relatively water insoluble soap of acid and said first metal by metathesis, allowing reaction mixture to separate into aqueous phase and insoluble soap phase. No. 2,411,832. Hooper Linford and William Baral to Union Oil Co. of California.

Reaction products obtained by addition of nascent thiocyanic acid in aqueous medium to cyclopentadiene-mono-olefinic adducts with consequent rearrangement of ring system of adducts, said products comprising isothiocyanates in which isothiocyanate group is directly attached to carbon atom of saturated, rearranged ring obtained from cyclopentadiene. No. 2,411,869. Herman Bruson to The Resinous Products & Chemical Co.

Producing beta-halo acyl halide comprises reacting beta lactone with halide of substance selected from group consisting of oxy-acid anhydrides of elements of periodic groups V and VI. No. 2,411,875. Thomas Gresham and Forrest Shaver to The B. F. Goodrich Co.

Producing chroman compounds comprising reacting substituted allylic alcohol having double bond in beta-gamma position in respect to hydroxyl group and at least one alkyl group in alpha position, with aromatic compound containing free hydroxyl group and unsubstituted position ortho to hydroxy and selected from group consisting of alkyl-substituted-para-di-hydroxy-benzenes and their mono-ethers and mono-esters, in presence of acidic substance. No. 2,411,942. Lee Smith and Herbert Ungnade to Regents of the University of Minnesota.

In preparation of esters from acetylene and saturated fatty monocarboxylic acid of the formula $C_nH_{2n+1}COOH$, wherein n is an integer from 1 to 5, improvement comprises bringing acetylene and the carboxylic acid at acetylene/acid ratio of 0.5/1 to 3.0/1, at 100-350° C. and in vapor phase in contact with zinc chromite. No. 2,411,962. William Freed to E. I. du Pont de Nemours & Co.

Obtaining polychlorinated straight-chain, aliphatic carboxylic acid halide, comprises heating anhydrous mixture comprising carbon monoxide and polychlorinated ethane which contains from 3 to 5 chlorine atoms, heating effected under superatmospheric pressure at temperature from 50° C. to 250° C. in presence of halide of polyvalent inorganic element, halide being Friddel-Crafts catalyst. No. 2,411,982. Clement Theobald to E. I. du Pont de Nemours & Co.

Preparation of aldehydes and acetals. No. 2,412,012. Louis Schmerling and Vladimir Ipatieff to Universal Oil Products Co.

Making formaldehyde from natural gas includes steps of heating mixture of methane and air with NO_2 to above 1100° F., and immediately cooling vaporized product by direct contact with cool formaldehyde solution. No. 2,412,014. Thomas Sherwood to Godfrey Cabot, Inc.

Preparation of thiolacetic acid comprises reacting acetic anhydride with hydrogen sulfide in presence of sodium acetate. No. 2,412,036. Ellsworth Ellinghoe to E. I. du Pont de Nemours & Co.

Purifying alkylolamides associated with other reaction products formed in reacting alkylolamines with fatty acids and their esters and containing alkylolamides, and other basic substances of bitter flavor. No. 2,412,113. Harland Young and David Rubinstein to Industrial Patents Corp.

Phenyl sulfonyl diesters of nitro alcohols. No. 2,412,116. Philip Baker, Jr., to Commercial Solvents Corp.

Phenyl sulfonyl triesters of nitro alcohols. No. 2,412,117. Philip Baker, Jr., to Commercial Solvents Corp.

Chlorinated sulfurized sperm oil cutting oil which yields active sulfur under conditions of normal use, cutting oil containing from 0.5% to 1.0% of lecithin to prevent such active sulfur from causing stains. No. 2,412,131. Thaddeus Culmer to The Ohio Oil Co.

Preparing aliphatic hydroxyamine comprising condensing ammonia with a dihydric alcohol of formula described in patent. No. 2,412,209. Joseph Dickey and James McNally to Eastman Kodak Co.

Producing starch esters containing at least 2.5 acyl groups per molecule of starch, comprises esterifying solution of starch in anhydrous medium consisting of admixture of ammonium acetate and acetamide at elevated temperatures with acylating agent, selected from group consisting of lower fatty acids and lower hydroxy fatty acids. No. 2,412,213. Martinus Groen.

Continuous process for producing anhydrous acetic acid from solution comprising major portion of acetic ester and aqueous acetic acid comprises introducing solution into middle part of distilling zone containing predetermined proportions of same acetic ester and water-insoluble water entraining oil to form with water azeotropic mixture of lower boiling point than azeotropic mixture of ester and water, etc. No. 2,412,215. Henri Guinot.

Purifying vegetable and animal oils, containing impurities, including free fatty acids, comprises, mixing therewith alkaline refining reagent capable of reacting with impurities to precipitate same and produce soap, etc. No. 2,412,251. Benjamin Clayton to Benjamin Clayton, as Refining, Unincorp.

Sulphonating organic condensation reaction product produced by subjecting mixture of phenol free of unsaturated hydrocarbon substituents with alkyl ether of phenol having unsaturated hydrocarbon substituent to condensing reaction in presence of katenoid condensing agent. No. 2,412,264. Mortimer Harvey to The Harvel Corp.

Producing vinyl chloride includes reacting acetylene with hydrogen chloride in presence of products of pyrolysis of ethylene dichloride. No. 2,412,308. Joseph Weiler to The Mathieson Alkali Works, Inc.

Monochloro para-xylylene dichloride. No. 2,412,389. Oliver Cass to E. I. du Pont de Nemours & Co.

Preparation of unsaturated aliphatic nitrile having general formula $C_nH_{2n-1}CN$ where n is a small whole number greater than 1 and not greater than 6. No. 2,412,437. Cary Wagner to Phillips Petroleum Co.

Triethylene glycol diheptoate. No. 2,412,469. Leonard Nicholl and William Bitler to Kay-Fries Chemicals, Inc.

Preparing ethyl halides comprising contacting mixture of ethylene-containing gas and hydrogen halide with zirconium salt at temperature at which ethylene and hydrogen halide combine. No. 2,412,550. Donald Bond and Michael Savoy to The Pure Oil Co.

Canadian

Process of purifying 3-picoline that is contaminated by the co-presence of at least one of the bases 4-picoline and 2, 6-lutidine. No. 438,941. Reilly Tar and Chemical Corp. (Francis E. Cislak and William R. Wheeler).

Process of preparing a butyric ester of 2-methyl-2 hydroxy butene-3. No. 438,954. The United Gas Improvement Co. (Frank John Soday).

Process of preparing a valeric ester of 3-methyl-3-hydroxy-butene-1. No. 438,955. The United Gas Improvement Co. (Frank John Soday).

Process of preparing a propionic ester of 2-methyl-2-hydroxy-butene-3. No. 438,956. The United Gas Improvement Co. (Frank John Soday).

Process for preparing methylene diphenyl diisocyanate by reacting p,p'-diaminodiphenylmethane with phosgene, the improvement which comprises carrying out the reaction in the presence of a tertiary amine as a catalyst. No. 438,960. Wingfoot Corp. (Joy Gabriel Lichty and Nelson Vernard Seeger).

Producing the acetic acid ester of alpha cyclohexyl alpha hydroxyisobutyrate by subjecting the hydroxy ester to reaction with ketone in the presence of an acid catalyst. No. 439,165. American Cyanamid Company (Theodore F. Bradley).

Beta-nitroalkyl ester. No. 439,166. American Cyanamid Company (Jack T. Thurston and Donald W. Kaiser).

Preparing a 1-cyanoethyl ester by reacting hydrogen cyanide with the corresponding vinyl ester in the presence of a basic catalyst. No. 439,168. American Cyanamid Company (Erwin L. Carpenter).

Preparing dicyanomethyl carbonate which includes the steps of reacting glycolonitrile, pyridine and phosgene in the presence of ether as the solvent pouring the reaction mixture into ice water and recovering the precipitated dicyanomethyl carbonate. No. 439,169. American Cyanamid Company (Ingenuin Hechenbleikner).

Bis (2-methoxy ethyl) amine salt of bis (2-methoxy ethyl) dithiocarbamic acid. No. 439,170. American Cyanamid Company (Russell T. Dean).

Method of preparing N-substituted aspartic acid esters. No. 439,171. American Cyanamid Company (Kathryn L. Lynch).

Process for obtaining ortho hydroxy phenylarsine oxides having a para amino- or substituted para amino group. No. 439,215. Parke, Davis & Company (Cliff S. Hamilton).

Diester of fumaric acid with an aliphatic alcohol containing at least one ethylenic linkage. No. 439,279. American Cyanamid Company (Theodore F. Bradley).

Paper, Pulp

Device for continuously applying layer of filling material to paper stock adhering to underside of felt during its travel between cylinders at wet end of cylinder paper machine comprising applicator roll beneath felt, means for maintaining coating of filling material upon surface of roll, suction box overlying roll and extending transversely across felt and engaging top of felt above roll adjacent point of engagement of felt with roll for maintaining suction upon paper stock engaging roll, etc. No. 2,411,416. Frederick Dieckbrader to The Hinde & Dauch Paper Co.

Paper coating, process consists in first leaching high protein content seed-meal with 4 to 10 times its own weight of acid aqueous solution having acid content equal to 3.8 to 6 lbs. of hydrochloric acid solution of sp.gr. 1.18 to 1.19, per 100 lbs. of seedmeal, etc. No. 2,411,989. Henry Dunham to The Borden Co.

Petroleum

Mineral oil beneficiated with small amount of reaction product of cashew nut shell oil and phosphorus pentasulphide. No. 2,411,160. Everett Hughes to The Standard Oil Co.

Cracking hydrocarbons comprises subjecting hydrocarbons to suitable cracking conditions of time, temperature and pressure in presence of

small amount of brominated ester. No. 2,411,200. Hillis Folkins and Carlisle Thacker to The Pure Oil Co.

Improved process for conversion of normal butane to isobutane in presence of aluminum chloride catalyst, comprises contacting normal butane hydrocarbon fraction in vapor phase containing not more than 0.5 mol per cent of hydrocarbons heavier than normal butane and free from unsaturated hydrocarbons and non-hydrocarbon impurities with solid granular isomerization catalyst comprising aluminum chloride adsorbed upon solid granular adsorptive material under vapor phase isomerization reaction conditions, in presence of minor amount of hydrogen chloride to produce isobutane, etc. No. 2,411,211. Robert Henry to Phillips Petroleum Co.

Treatment of complex hydrocarbon fraction to separate chemically similar hydrocarbon components therefrom from other hydrocarbon components contained therein which ordinarily distill from hydrocarbon fraction in same temperature range as chemically similar hydrocarbon components distilled therefrom. No. 2,411,437. George Lake to Union Oil Co. of California.

In solvent-dewaxing process wherein waxy material is separated at suitably low temperatures from waxy petroleum stock, mixed with suitable composite solvent, method for removing ash-forming constituents from separated wax cake comprises adding at least one constituent of solvent involved in dewaxing process to wax cake in amount in excess of volume of wax cake, heating mixture to temperature above 120° F. but below temperature to boil solvent and water, mixing with mixture small proportion by volume of water. No. 2,411,492. Byron Wingrove to Socony-Vacuum Oil Co., Inc.

Treating mineral oils and separating various constituents therein contained, comprises mixing mineral oil with nitrocyclohexane and effecting solution therebetween, cooling solution to temperature at which segregation into more than one portion results, separating segregated portions. No. 2,411,502. Lawton Burrows to E. I. du Pont de Nemours & Co.

Composition of matter comprising hydrocarbon oil subject to deterioration at elevated temperatures and small proportion, sufficient to substantially stabilize oil at such elevated temperatures, of compound having formula described in patent. No. 2,411,583. John McNab and Carl Winning to Standard Oil Development Co.

Catalytic conversion of hydrocarbon oils wherein catalyst in subdivided form is continuously circulated in admixture with oil vapors through conversion zone and in admixture with oxidizing gas through regeneration zone, method of maintaining seal between conversion and regeneration zones comprises accumulating body of catalyst from one zone in storage zone, periodically transferring catalyst so accumulated into sealing zone separate and independent from storage zone, increasing pressure on catalyst within sealing zone, periodically transferring catalyst from sealing zone to feeding zone separate and independent from storage and sealing zones, etc. No. 2,411,603. Charles Tyson to Standard Oil Development Co.

In concentrating aliphatic unsaturated hydrocarbon from hydrocarbon mixture containing same and other close boiling more saturated hydrocarbons wherein stream of hydrocarbon mixture is introduced at intermediate point in absorption column, furfural containing small amounts of water is introduced near top of column and serves as selective solvent for unsaturated hydrocarbon, etc. No. 2,411,785. Karl Hachmuth to Phillips Petroleum Co.

Treating well producing both hydrocarbons and water comprises establishing body of pumpable plastic having definite yield point high enough to prevent it from penetrating formations until subjected to minimum applied differential pressure sufficient to exceed its yield point at larger pored formations and which will cause its flow, selectively, into larger pores of formations, said plastic being adapted to harden in time to frangible solid under bottom-hole conditions, etc. No. 2,411,793. Harvey Kennedy and Paul Gassett to Gulf Research & Development Co.

Alkylation process comprises introducing isobutane and ethane-ethylene fraction to reaction zone and therein reacting substantial portion of ethylene with isobutane in presence of aluminum chloride catalyst, etc. No. 2,411,817. Ralph Thompson and Joseph Chenicek to Universal Oil Products Co.

In process for converting normal pentane to isopentane wherein normal pentane is contacted in admixture with hydrogen halide promoter at isomerizing conditions with isomerization catalyst comprising aluminum chloride in reaction zone, etc. No. 2,411,835. William Ross and George Carlson to Shell Development Co.

Purifying petroleum products contaminated with dissolved catalytically active compounds of copper comprises washing petroleum product in liquid state with dilute aqueous solution of sodium thioglycolate. No. 2,411,958. Melvin Dietrich and Charles Pedersen to E. I. du Pont de Nemours & Co.

Purifying petroleum products contaminated with dissolved catalytically active compounds of heavy metals selected from group consisting of copper, iron, cobalt, manganese, and vanadium comprises washing petroleum product in liquid state with dilute aqueous solution of member of group consisting of thiourea, thiosemicarbazide, N-guanylthiourea, beta-amino ethyl mercaptan and dithiourea. No. 2,411,959. Melvin Dietrich and Charles Pedersen to E. I. du Pont de Nemours & Co.

Production of normally liquid saturated hydrocarbons comprises reacting isoparaffin with olefin under alkylating conditions in presence of alkylation catalyst consisting of major proportion of hydrogen fluoride and minor proportion of boron fluoride. No. 2,411,992. Aristid Grosse and Carl Linn to Universal Oil Products Co.

Conversion process comprises contacting hydrocarbons with subdivided solid catalyst in reaction zone maintained under conversion conditions, simultaneously passing oxygen-containing gas through mass of contaminated catalyst particles in regenerating zone maintained at combustion temperature to burn contaminants from catalyst particles, etc. No. 2,411,996. Louis Kassel to Universal Oil Products Co.

Refining close cut aromatic hydrocarbon fraction containing undesirable unsaturated hydrocarbon impurities, comprises distilling aromatic hydrocarbon fraction in presence of anhydrous aluminum chloride and metallic iron whereby unsaturated hydrocarbon impurities combine with aluminum chloride to form sludge-like material, metallic iron being disposed in vapor phase portion of distillation apparatus and aluminum chloride disposed in liquid phase portion. No. 2,412,010. Walter Rippeteau, Jr., to Phillips Petroleum Co.

Continuous process for promoting thermal vapor phase, hydrocarbon reactions in elongated upright reaction chamber containing solid contact material. No. 2,412,096. William Odell to Lion Oil Co.

Effecting conversion of hydrocarbons in presence of particle-form solid contact mass material. No. 2,412,135. Louis Evans to Socony-Vacuum Oil Co., Inc.

Conversion of hydrocarbons in presence of moving particle-form solid contact mass material with equal exposure of all portions of contact mass. No. 2,412,136. Louis Evans and Frederick Ray to Socony-Vacuum Oil Co., Inc.

Conducting low temperature hydrocarbon conversion reaction in which at least one reactant is hydrocarbon which comprises conducting reaction in reaction zone in presence of at least one liquid hydrocarbon having dissolved therein hydrocarbon soluble catalyst characterized by having boiling point above that of desired product of hydrocarbon conversion reaction as effective catalytic agent, etc. No. 2,412,143. Manual Gorin and Will Swerdloff to Socony-Vacuum Oil Co., Inc.

Treating hydrocarbon materials containing minor amounts of fluorine compounds as impurities by contact with bauxite containing siliceous material under conditions such that fluorine is retained by bauxite and silicon tetrafluoride is formed from such siliceous material, improvement comprises, passing hydrocarbon material effluent from such treatment with such bauxite, and containing said silicon tetrafluoride, into bottom of purification zone comprising lower contacting zone and upper filtration zone, passing aqueous solution of sodium hydroxide to top of contacting zone and contacting same therein with hydrocarbon material to dissolve silicon tetrafluoride therein, etc. No. 2,412,220. Gerald Ibach and Carmen Tate to Phillips Petroleum Co.

Producing alkylated aromatic hydrocarbons comprises subjecting aromatic hydrocarbon and olefinic hydrocarbon to contact under alkylating conditions in presence of alkylating catalyst whose alkylating components consist of pyrophosphate of metal selected from members of right-hand column of group I of the periodic table. No. 2,412,229. Raymond Schaad to Universal Oil Products Co.

Producing aromatic hydrocarbons having higher number of carbon atoms per molecule than aromatic hydrocarbon from which they are derived, comprises subjecting aromatic hydrocarbon to contact with alkoxy compound under alkylating conditions in presence of catalytically effective amount of pyrophosphate of heavy metal selected from members of right-hand column of group I of periodic table. No. 2,412,230. Raymond Schaad to Universal Oil Products Co.

Improvement in cracking hydrocarbon oils for production of high anti-knock gasoline comprises subjecting oil to cracking temperature in presence of aluminum fluoride containing combined moisture. No. 2,412,371. John Teter to Sinclair Refining Co.

Refining low-grade hydrocarbon oils comprises preheating oil to temperature of between 400° F. and 700° F. depending upon determined vaporization point and supplying pre-heated stock to retort in quantity sufficient to charge latter to approximately one-third of its total capacity; sealing charge and applying heat to develop pressure condition of approximately 200 p.s.i. and injecting spray of supplementing hot oil through produced gases while passing off and condensing such portion of evolved vapors as becomes necessary to maintain given pressure condition, etc. No. 2,412,427. Elmer Records.

Canadian

Apparatus for the catalytic conversion of hydrocarbons. No. 439,330. The M. W. Kellog Company (Lee Van Horn and Louis J. Kelly).

Photographic

Silver halide photographic emulsions containing sensitizing dyestuff of general formula described in patent. No. 2,411,507. Ronald Collins and John Miller to Ilford, Ltd.

Photographic silver halide emulsion spectrally sensitized with at least one sensitizing dye selected from group consisting of 2'-cyanine dyes and oxacarbocyanine dyes, emulsion containing, as supersensitizer, at least one heterocyclic base selected from those represented by general formula described in patent. No. 2,411,546. Edward Knott to Eastman Kodak Co.

Producing photoprinting material comprises coating solution of light-sensitive N-nitroso-N-arylamide onto suitable carrier and drying. No. 2,411,811. Donald Sargent to General Aniline & Film Corp.

Producing magenta color photographic image in gelatino silver-halide emulsion layer comprises exposing layer and developing it with aromatic primary amino developing agent in presence of coupler compound having formula described in patent. No. 2,411,951. Abraham Bavley to General Aniline & Film Corp.

Canadian

Composition adapted to rapidly fix a photographic element which includes a non-gelatin layer comprises a mixture of a water soluble thiocyanate and thiourea. No. 438,886. Canadian Kodak Co., Ltd. (John I. Crabtree and George T. Eaton).

Tanning photographic developer free of sulphite, containing an alkaline solution of pyrocatechol as a developing agent and from about 0.1 gram to at least 10 grams per litre of ascorbic acid. No. 438,887. Canadian Kodak Company, Ltd. (Arnold Weissberger and Hugo A. Kurtzner).

Anti-static photographic film comprising a cellulose ester support having thereon a sensitive emulsion layer and a layer of an organic acid ester of cellulose containing from 1.0 per cent to 40 per cent of aluminum sulphate. No. 438,888. Canadian Kodak Co., Ltd. (Gale F. Nadeau and Clarence S. Hunter).

Single-powder photographic developer containing in intimate admixture an organic developing agent, phthalic anhydride and trisodium phosphate monohydrate. No. 439,013. Canadian Kodak Company, Ltd. (Frederic R. Bean).

Polymers

Preparing polyamine resin comprising reacting mixture of poly (haloalkyl) aromatic hydrocarbon having at least two active haloalkyl groups, capable of precipitating silver halide from silver nitrate solution in the cold, substituted in the aromatic nucleus, with concentrated aqueous ammonia solution sufficiently concentrated to avoid hydrolysis of poly (haloalkyl) aromatic hydrocarbon in presence of basic acid acceptor. No. 2,411,141. Chester Adams to Standard Oil Co.

Method described in claim 3 in which aromatic hydrocarbon is poly (haloalkyl) poly-nuclear aromatic hydrocarbon having at least two active haloalkyl groups, capable of precipitating silver halide from silver nitrate solution in the cold, substituted in aromatic nucleus. No. 2,411,142. Charles Kelso and Chester Adams to Standard Oil Co.

Sheet material suitable for use as backing for adhesive tape and for other purposes and which is provided, on one of its surfaces, with non-tacky coating characterized by softness, flexibility, excellent resistance to scuffing tests, freedom from flaking, and ability to withstand sterilizing temperatures without melting or decomposing, coating comprising from 30 to 65% by weight of substantially polymerized reaction product formed from terpene with maleic anhydride and polyhydric alcohol, and from 35 to 70% by weight of additional material comprising mostly filler. No. 2,411,237. George Turner and Elwood Wenzelberger to Johnson & Johnson.

Reacting branched chain dichlorodialkyl sulfide and polyhalo dialkyl sulfide containing at least three but not more than four halogen atoms per molecule with aqueous solution of water-soluble polysulfide to form elastomer. No. 2,411,276. Ivar Kinneberg and Charles Thomas to Universal Oil Products Co.

Obtaining improved hydrolyzed ethylene/vinyl organic ester interpolymer filament, comprises drawing at temperature within range of from 80° C. to 100° C. in medium containing H_2O at temperature within range of from 80° C. to 100° C., filament of hydrolyzed interpolymer of ethylene with vinyl ester of monocarboxylic acid having general formula

RCOOH, etc. No. 2,411,474. Halsey Stevenson to E. I. du Pont de Nemours & Co.

Making liquid phenol-formaldehyde resin condensation product comprises reacting from two to three mols of formaldehyde with each mol of phenol in presence of acid catalyst selected from group consisting of salicylic acid, ethyl salicylic acid and butyl salicylic acid in concentration of from 3¼ to 5% of water present in reaction mixture. No. 2,411,557. Charles Schuh to Carbide & Carbon Chemicals Corp.

Vinyl resin coating composition of limited heat-reactive type comprising acid-reacting vinyl resin of group consisting of copolymer of vinyl chloride, vinyl ester of lower saturated fatty acid, and aliphatic, alpha, beta-olefinic carboxylic acid, in which from 3.2% to 40% of ester and from 0.5% to 20% of acid, by weight of copolymer, are combined therein, etc. No. 2,411,590. George Powell, 3rd, to Carbide & Carbon Chemicals Corp.

Polymerization process comprising steps in combination of mixing methyl-acrylate and alpha olefin in liquid form at room temperature and interpolymerizing mixture by application thereto of ultra violet light to yield high molecular weight, solid interpolymer of methylacrylate and an alpha olefin. No. 2,411,599. William Sparks and Anthony Gleason to Standard Oil Development Co.

Macromolecular polymer having the empirical formula (C_2F_4) x. $(SO_2)y$, wherein x and y are integers, ratio of x to y being within range of from 1:1 to 125:1. No. 2,411,722. Jesse Harmon and Robert Joyce, Jr. to E. I. du Pont de Nemours & Co.

Method of extruding an oxidisable thermoplastic material from receptacle having open top and orifice adjacent to its bottom, comprising placing material in solid state in receptacle, forming discrete non-miscible liquid layer on other wise exposed top surface of material to prevent oxidation of surface when material is exposed to atmospheric pressure at its molding temperature, etc. No. 2,411,847. John Bokeeno to Radio Corp. of America.

Laminating self-sustaining, non-vulcanizable, non-fibrous, synthetic film material with butadiene copolymer material comprises forming on surface of at least one of said materials adhesive composition consisting of polyvinyl butyral containing 20.7% to 47.4% combined butyraldehyde, and polyhydric phenolaldehyde resin. No. 2,411,878. Albert Hershberger to E. I. du Pont de Nemours & Co.

Curing plastic polymer of ester of acrylic acid, comprises heating polymer with from 2 to 25% by weight of alkali metal salt of silica dispersed therein. No. 2,411,899. Stephen Semegen to The B. F. Goodrich Co.

Resinous reaction product of partially reacted alpha-beta-unsaturated dicarboxylic acid-dihydric alcohol ester which has been preformed and reacted to phenol red acid number between 30 and 150 and which has reacted content of 0.7 to 1.5 moles dihydric alcohol per mole of dicarboxylic acid, and from above 0.75 to 3 moles per mole of dicarboxylic acid in ester of monohydric alcohol ester of unsaturated rosin acid, etc. No. 2,411,904. George Spiller to Hercules Powder Co.

Polymeric addition product of monomeric hydrocarbon polythiol and polymeric polyunsaturated ester of polyhydric alcohol with unsaturated acid which is, apart from carboxyl group, hydrocarbon. No. 2,411,954. William Burke to E. I. du Pont de Nemours & Co.

Sub-resinous esterification product of formula described in patent. No. 2,411,957. Melvin De Groote and Bernhard Keiser to Petrolite Corp., Ltd.

Molecularly oriented fiber showing characteristic crystalline X-ray diffraction pattern comprises cold-drawn copolymer of acrylonitrile, ethyl acrylate and ethyl methacrylate. No. 2,412,034. Gaetano D'Alelio to General Electric Co.

Obtaining improved filaments composed of synthetic linear polyamide containing 10% to 20% of phenolformaldehyde resin which does not become infusible on heating for short periods at 275° C. to 285° C. and which is acid catalyzed reaction product of phenol and formaldehyde in molar ratio within 0.5:1.0 and 1.0:1.0, said process comprising treating said filaments in molecularly oriented state while held at fixed length with water at temperature of at least 85° C. until filaments are set in shape treated, etc. No. 2,412,054. William McClellan to E. I. du Pont de Nemours & Co.

In self-sealing fuel tanks having interliner comprising butadiene copolymer, improvement comprises thin layer of composition comprising polyvinyl butyral wherein combined butyraldehyde ranges from 20.7% to 44.0% and insoluble, infusible polyhydric phenolaldehyde resin, firmly bonded to, and in face to face contact with, interlines of copolymer. No. 2,412,148. Albert Hershberger to E. I. du Pont de Nemours & Co.

Process and apparatus for producing continuous sheet of biaxially oriented organic polymer. No. 2,412,187. Fred Wiley, Robert Canfield, Raymond Jesionowski and James Bailey to Plax Corporation.

Depolymerizing acrylate resins comprises wetting resin with aqueous liquid, subjecting same to action of direct flame of temperature above 400° C. for short time to decompose resin to liquid, rapidly removing product from zone to reaction to prevent volatilization of product. No. 2,412,296. Carl Shapiro.

Composition relatively free from swelling or hardening as result of gain or loss of moisture in atmosphere, comprises casein and compatible amide of sulphonic acid containing single benzene nucleus and aliphatic hydroxy amine, reaction between sulfonic acid and amine involving sulfo group and nitrogen atom of two, hydroxyl of amine being unreacted in amide, amide being present in amount sufficient to plasticize the casein. No. 2,412,327. George Eilerman to Pittsburgh Plate Glass Co.

Striping thermoplastic flexible strip material. No. 2,412,429. Eugene Slingluff and Donald Scheu to The B. F. Goodrich Co.

Curing plastic polymer of an ester of acrylic acid, comprises heating polymer with 2 to 25% by weight of alkali metal salt of stannic acid. No. 2,412,475. Stephen Semegen to The B. F. Goodrich Co.

Curing plastic polymer of an ester of acrylic acid comprises heating polymer with 2 to 25% by weight of alkali metal salt of vanadic acid. No. 2,412,476. Stephen Semegen to The B. F. Goodrich Co.

Improving polymerization monomeric vinyl products such as styrene and butadiene, includes heating monomer containing inhibitor such as hydroquinone to approximately boiling point while in contact with carbon black. No. 2,412,504. George Goldfinger to Godfrey L. Cabot, Inc.

Canadian

Process for producing an unmasticated reinforced copolymer from a polymerizable material comprising butadiene and isobutylene. No. 439,160. Theodore A. TeGrotenhuis.

Processes and Methods

Evaporating liquids comprises reducing pressure on stream of liquid while liquid is at such temperature that reduction in pressure causes at least part of liquid to flash into vapor, instantaneously compressing vapor in stream of liquid above condensation pressure of vapor at prevailing temperature but without condensation of vapor, thereafter immediately separating vapor from liquid before condensation of vapor occurs. No. 2,411,186. Benjamin Boeckeler to The Hydrojet Corp.

Process for carrying out reactions comprises forming suspension of gases and powdered catalyst, passing suspension upwardly through reaction zone maintained under conditions to bring about desired reaction, passing reaction products containing powdered catalyst entrained therein from upper part of zone and through filtering zone in contact with moving bed of coarse granular material of same composition as powdered catalyst, etc. No. 2,411,208. Homer Hall and John Munday to Standard Oil Development Co.

In manufacture of piezo-electric elements steps comprising immersing crystal element in etching solution and etching surface while vibrating element and agitating solution at supersonic frequency. No. 2,411,298. Sidney Shore to North American Philips Co., Inc.

Winding continuous strand of thermoplastic resinous material causing strand to pass across periphery of rotatable member in direction of its rotation during winding operation, simultaneously forming and depositing glass fiber web in which fibers are haphazardly arranged and interlaced with each other on periphery of rotatable member about the strand, pulling web and strand together from periphery of rotatable member at rate higher than rate of movement of periphery to draw fibers of mat into parallelism with strand. No. 2,411,326. James McMillian and Stanley Lake to Owens-Corning Fiberglas Corp.

Method of electroplating and treating cutting edge tools and the like. No. 2,411,327. Axel Lundbye to Crowell-Collier Publishing Co.

In execution of catalytic reactions wherein reactants are contacted with catalyst consisting of preformed organo-metal halide complex catalyst in reaction zone comprising metal-containing surface in direct contact with catalyst, method of inhibiting corrosion of metal-containing surface and increasing useful life of catalyst comprises maintaining in catalyst corrosion inhibiting amount of member of group consisting of antimony and antimony halides in which all halide atoms are same. No. 2,411,483. Aaron Wachter and Richard Treseder to Shell Development Co.

Separating constituents of gaseous mixtures comprises liquefying portion of compressed and cooled gaseous mixture, preliminarily scrubbing remainder of gaseous mixture with liquid portion thereof to provide vapor free from impurities and liquid in which impurities are concentrated, subjecting vapor in liquefaction to provide liquid free from impurities and separate from liquid previously formed during preliminary scrubbing operation, subjecting second liquid to rectification, etc. No. 2,411,680. Wolcott Dennis to Air Reduction Co., Inc.

Separating mixed gases by rectification into vapor product and liquid product including an interchanger for cooling mixed gases by heat interchange with vapor product, means for withdrawing from interchanger portion of vapor product, compressor for compressing portion withdrawn, expansion engine for expanding part of compressed portion, means for returning expanded portion to interchanger. No. 2,411,711. William De Baufre.

Apparatus for separating one substance in vapor form from two immiscible liquid substances, comprising elongated tower containing fractionating zone, intermediate liquid-separating zone, and stripping zone for bottoms from fractionating zone, means for feeding into fractionating zone near bottom thereof mixture of fluids to be separated, means for removing vapor from top of fractionating zone, means for conducting liquid bottoms from fractionating zone into separation zone, etc. No. 2,411,809. Walter Rupp and Richard Wright to Standard Oil Development Co.

In effecting reactions via abnormal addition, steps of reacting unsaturated organic compound containing unsaturated linkage between two carbon atoms having dissimilar number of hydrogen atoms attached thereto, with compound selected from class consisting of hydrogen sulfide and mercaptans in the presence of metallo-hydrocarbon compound in which carbon atom of hydrocarbon radical is united directly to metal of fourth group of periodic table which metallo-hydrocarbon is decomposed by photochemical radiations above 3000 Angstrom units, effecting reaction photochemically in absence of peroxides under deliberate influence of photochemical radiations above 3000 Angstrom units but capable of decomposing metallo-hydrocarbon compounds. No. 2,411,961. Theodore Evans and William Vaughan and Frederick Rust to Shell Development Co.

In effecting reactions via abnormal addition, steps of reacting unsaturated organic compound containing unsaturated linkage between two carbon atoms having dissimilar number of hydrogen atoms attached thereto with compound selected from class consisting of hydrogen sulfide and mercaptans, in presence of carbonylic compound which is decomposed by light having wave length above 3000 Angsrtom units selected from class consisting of ketones, aldehydes and acid halides, etc. No. 2,411,983. William Vaughan and Frederick Rust to Shell Development Co.

Additional patents on all other classifications from the above volumes will be given next month.

Abstracts of Canadian Patents

Granted and Published December 3, 1946

Method of decolourizing hydrocarbon oil, which comprises contacting said oil with a water-insoluble magnesium aluminate precipitated from aqueous solution in the presence of a water-soluble ammonium compound. No. 438,364. Porocel Corporation (William A. La Lande, Jr.).

Laminated material having waterproof to gasproof properties comprising a thermoplastic film or foil and a plasticized fabric having thermoplastic yarns and non-thermoplastic yarns on each side of said film or foil. No. 438,394. Camille Dreyfus (Arthur Lyem).

Process for the preparation of a laminating fabric. No. 438,395. Camille Dreyfus (Arthur Lyem).

Dioxazine series dyestuff. No. 438,401. Heinrich Greune, Fritz Maennchen, Max Thiele, and Gerhard Langbein).

Granted and Published December 10, 1946

Waxed paper bag sealing machine. No. 438,423. Arthur B. McLauchlan.

Removing chromium from liquors containing a salt thereof by precipitating with a water-soluble alkali metal alkyl xanthate agitating the mix to agglomerate the precipitated chromium xanthate and removing. No. 438,441. American Cyanamid Company. (Robert B. Barnes and Garnet P. Ham).

Method of reclaiming heat and SO_2-gas from relief gases and waste liquor in the cooking of sulphite cellulose. No. 438,442. American Heat Reclaiming Corporation. (Carl Johan Lockman).

Composition of matter comprising the condensation product of an aminotriazole, an aldehyde and a halogenated nitrile. No. 438,452. Canadian General Electric Company, Ltd. (Gaetano F. D'Alelio).

Resinous composition comprising the reaction product of (1) a chlorinated acetamide with (2) a partial reaction product of ingredients comprising formaldehyde and phenylhydrazino diamino s-triazine. No. 438,453. Canadian General Electric Company, Ltd. (Gaetano F. D'Alelio).

Resinous composition comprising the reaction product of (1) a chlorinated acetamide with (2) the product of partial reaction of ingredients comprising formaldehyde and 2,4,6-tri-(tolylamino) pyrimidine. No. 438,454. Canadian General Electric Company, Ltd. (Gaetano F. D'Alelio).

Supporting cast material by mouldable vinyl composition useful as surgical cast. No. 438,467. Carbide and Carbon Chemical, Ltd. (Carl W. Patton).

Abrasive or wear resistant article comprising crystalline granular sintered alumina in which Mn_2O_3 is in solid solution and which alumina contains titanium in the lattice thereof. No. 438,468. The Carborundum Company. (Raymond Calvin Benner and Henry Nicholas Baumann, Jr.).

Zeolite regenerating compound for use in salt brine consisting of an aqueous sclution of sodium bicarbonate, potassium carbonate, trisodium phosphate sodium metaphosphate and caustic soda. No. 438,476. The Dacar Chemical Products Company. (Norman G. Stone and Samuel W. Holliday).

Composition liberating heat when added to water comprising a mixture of 3 to 6 per cent aluminum, 6 to 12 per cent finely divided sodium chlorite and a major proportion of caustic soda based on the total weight of aluminum chlorite and alkali. No. 438,479. The Drackett Company. (Wilmer C. Gangloff and Stuart O. Fiedler).

Pigment dyeing a fabric while avoiding migration of colour on drying by forcing through the fabric a pigmented emulsion containing at least about 20 per cent of an inner aqueous phase and an outer continuous lacquer phase and drying. No. 438,485. Interchemical Corporation. (Norman S. Cassel).

Coloured mirror. No. 438,489. Libbey-Owens-Ford Glass Company. (Liberty Mirror Works, William H. Colbert and Willard L. Morgan).

Process for chlorine recovery from magnesium chloride electrolysis. No. 438,502. The Solvay Process Company. (Arlie P. Julien and James K. Farrell).

Packing material containing butadiene-acrylonitrile copolymer; wood flour; asbestos fibre; natural rubber; a curing reagent, an accelerating agent and an anti-oxidant and a plasticizer. No. 438,504. The Standard Products Company. (Roger C. Bascom).

Producing aluminous material by neutralizing a sodium aluminate solution at 110 to 170°F at a rate of from 2 to 30 per cent per minute by adding an acidic material. No. 438,526. Aluminum Company of America. (August Henry Riesmeyer).

Method of making shoe filler compositions. No. 438,531. North American Holding Corporation and Parshad Holding Corporation. (Ernest D. Sackett).

Flexible gas-proof electrically conducting sheet material suitable for balloon construction which comprises a layer of woven fabric of cellulose having on one side a coating consisting essentially of ethyl cellulose and a metallic foil bonded to said fabric. No. 438,534. Claude George Bonard. (Albert Mellor and Ralph James Mann).

Process for the production of a glycol from a halohydrin of a glycol containing fewer carbon atoms. No. 438,535. Claude George Bonard.

Manufacture of phthalocyanine colouring matters by heating a mixture consisting of an o-arylene-dicyanide and a cupriferous reagent until the formation of a blue to green solid colouring matter and recovering. No. 438,537. Imperial Chemical Industries, Ltd. (Isidor M. Heilbron, Francis Irving and Reginald P. Linstead).

Producing colouring matters of the phthalocyanine series by heating an o-arylene-dicyanide at a temperature between 150° to 400°C. in the presence of a substance capable of yielding iron, nickel or cobalt. No. 438,538. Imperial Chemical Industries, Ltd. (Isidor M. Heilbron, Francis Irving, and Reginald P. Linstead).

Anthraquinone dyestuff. No. 438,540. Klaus Weinand and August Modersohn.

Granted and Published December 17, 1946

Method of making moulds having transition cores. No. 438,560. Raymond John Miller.

Method of producing a plate for ink and dye printing, which includes the step of providing a carrier with a toothed or grained surface. No. 438,572. Bennett F. Terry.

Method of regulating the degree of conversion of a hydrocarbon fluid within a continuous flow path. No. 438,590. The British American Oil Company, Ltd. (Robert L. Rude).

Partial polymer and copolymer of divinyl benzene. No. 438,594. Canadian General Electric Company, Ltd. (Gaetano F. D'Alelio).

Reaction product of aldehyde and triazole derivative. No. 438,595. Canadian General Electric Company, Ltd. (Gaetano F. D'Alelio).

Preparing pure nitric oxide by mixing nitrogen dioxide with a combustible gas selected from the class consisting of hydrogen and the hydrocarbons and the said passing mixed gases through an orifice into a burning chamber igniting and burning, condensing the water vapour and removing the carbon dioxide and collecting. No. 438,599. Canadian Industries, Ltd. (Milton Heins Wahl).

Manufacture of anhydrous ferric chloride by reacting a fused salt bath containing ferrous chloride with chlorine at such a temperature that ferric chloride is formed and is vaporized condensing the ferric chloride and regenerating the fused salt bath by adding metallic iron. No. 438,601. Canadian Industries, Ltd. (Leslie James Burrage and Dennis Brundrit).

Process for manufacturing a shaped article from a high molecular weight synthetic linear polyamide. No. 438,602. Canadian Industries, Ltd. (Albert Faris Smith).

Chlorine and sulphur dioxide separating process. No. 438,603. Canadian Industries, Ltd. (Harrison Cornforth Carlson).

Process which comprises bringing trichloroethylene in contact in the liquid state with aluminum chloride and sulphur monochloride. No. 438,604. Canadian Industries, Ltd. (William August Hoffman).

Process for forming sheets from a cold-drawing melt-spinnable polymer. No. 438,605. Canadian Industries, Limited. (Henry Dorroh Foster).

Production of thioethers by reacting ethylene and a sulphydryl compound of the group consisting of hydrogen sulphide methyl mercaptan and ethyl mercaptan at a pressure of at least 500 atmospheres and a temperature of about 120°C. to 200°C. No. 438,606. Canadian Industries, Ltd. (Jesse Harmon).

Catalyst composition comprising an intimate mixture of the oxides of tungsten and molybdenum in which the mole ratios of the oxides vary from 10:1 to 1:10. No. 438,607. Canadian Industries, Ltd. (Herrick Ransom Arnold).

Method of effecting substitution chlorination of trichlorethylene by contacting trichlorethylene at a temperature between 200° C and 600°C and in the presence of a copper salt oxidation catalyst with chlorine and oxygen in the ratio of one mole oxygen to two moles chlorine. No. 438,608. Canadian Industries, Ltd. (Oliver Wilfred Cass).

Metal article having an adherent coating consisting of a baked thin film not exceeding one mil in thickness of a polymer of ethylene said baked film melting above 120°C and being insoluble in xylene. No. 438,609. Canadian Industries, Ltd. (Milton John Roedel).

Apparatus for dry-spinning filaments from a solution of cellulose acetate. No. 438,610. Canadian Industries, Ltd. (Robert M. Hoffman).

Photographic element comprising a support containing at least one stratum composed essentially of an orientable vinyl fluoride homopolymer which has a softening point above 150°C having superposed thereon at least one radiation sensitive layer. No. 438,613. Canadian Industries, Ltd. (Paul Rolland Austin).

An ester of 2,9-dimethyl-4,7-dithiasebacic acid. No. 438,614. Canadian Industries, Ltd. (Carl Martin Langkammerer).

Process for preparing a benzothiazolium aryl quaternary salt comprising treating a N-arylthiobenzothiazolone with an alkyl-p-toluenesulphonate. No. 438,616. Canadian Kodak Company, Ltd. (Leslie G. S. Brooker and William Waldo Williams).

Polymethine dye intermediate. No. 438,617. Canadian Kodak Company, Ltd. (Robert H. Sprague).

Process for preparing a ketone comprising hydrolyzing in the presence of an acid a 2-diacetylmethylene-1-alkyl-1, 2-dihydroquinoline. No. 438,618. Canadian Kodak Company, Ltd. (Leslie G. S. Brooker and Frank L. White).

Liquid fuel or oil container in which the retaining walls comprise a composite fabric material consisting of two or more layers of fabric and one or more layers of a synthetic rubber-like composition. No. 438,653. Imperial Chemical Industries, Ltd. (Leonard Shakesby and Wilfred Baker).

Aqueous carroting solution for treating furs comprising nitric acid, hydrogen peroxide and a hydrolyzing acid which is not volatile at the temperature at which the carroted fur is dried. No. 438,658. Pellissier, Jonas & Rivet, Inc. (Michael Mulqueen).

Method of preparing a coated sheet of a thermoplastic resin. No. 438,664. Pittsburgh Plate Glass Company. (Maxwell Aaron Pollack, Franklin Strain and Irving Elkin Muskat).

Apparatus for forming continuous biaxially oriented sheet of solvent-free organic polymers. No. 438,665. Plax Corporation. (Fred Edwin Wiley, Raymond Stanley Jesionowski, Robert Withington Canfield and James Bailey).

Electrical resistor comprising a ceramic body of essentially coherent non-porous structure containing as its major ingredient a chromium titanate. No. 438,675. The Titanium Alloy Manufacturing Company. (Eugene Wainer).

Process for the production of pulp from fibre-bearing vegetable materials. No. 438,687. Gustav Ullmann. (Salford and English Cellulose Derivative, Ltd.).

Production of a 3-ketobutanol from acetone and formaldehyde. No. 438,691. Claude George Bonard. (James Lincoln and James Gordon Napier Drewitt).

Production of butanol-1-one-3 by condensing acetone with formaldehyde in an alkaline medium. No. 438,692. Claude George Bonard. (James Gordon Napier Drewitt).

Producing melamine from a dicyandiamide or cyanamide by introducing into a container having said compound therein an inert gas at a superatmospheric pressure and heating at an elevated temperature. No. 438,694. Henkel & Cie., G.M.B.H. Dusseldorf-Holthausen. (Rudolf Kohler).

Granted and Published December 24, 1946

Making opaque white pigments consisting essentially of lead oxide chemically combined with acidic oxides from the group silica, alumina, titanic oxide and zirconia. No. 438,700. Louis Edward Barton.

Opaque white pigment consisting of lead oxide silica and lead halide in chemical combination. No. 438,701. Louis Edward Barton.

Production of dialkyl esters of N-substituted aspartic acid. No. 438,722. American Cyanamid Company. (Kathryn L. Lynch).

Method of preparing di-(2,4-di-tertiary amyl) phenoxy ethanol monosulfide. No. 438,723. American Cyanamid Company. (Elmer W. Cook and William D. Thomas, Jr.).

Hard facing alloy consisting mainly of tungsten carbide, iron carbide, chromium and cobalt and containing not more than 5 per cent of deoxidizing and grain refining metal. No. 438,739. Callite Tungsten Corporation. (Enrico Zampieri and Jacob Kurtz).

Divinyl benzene partial copolymer preparation. No. 438,740. Canadian General Electric Company, Ltd. (Gaetano F. D'Alelio).

Flexible closure liner facing material for beer containers consisting of aluminum powder and resin spot facing material. No. 438,748. Continental Can Company, Inc. (Curtis E. Maier).

Paper liner facing material comprising a paper base and a coating thereon. No. 438,749. Continental Can Company, Inc. (Curtis E. Maier).

Magnesium base alloy containing from 1 to 3 per cent of manganese and from 0.02 to 0.05 per cent of calcium. No. 438,756. The Dow Chemical Company. (Joseph D. Hanawalt).

Method of separating magnesium from vapour admixture with carbon monoxide. No. 438,757. The Dow Chemical Company. (Roy C. Kirk, Charles E. Nelson and Thomas H. McConica).

Polymer in which the predominant constituent is vinyl chloride and triethylene glycol di-phenylacetate. No. 438,767. The B. F. Goodrich Company. (Thomas L. Gresham).

Lead coating flux consisting of zinc chloride 79.5 per cent, ferric chloride 15 per cent and ammonium chloride 5.5 per cent. No. 438,776. The International Nickel Company of Canada, Ltd., Copper Cliff. (The International Nickel Company, Inc., and Eugene Joseph Kalil).

Process for the production of hydrocarbons from carbon monoxide and hydrogen. No. 438,830. Claude George Bonard. (Walter Henry Groombridge and Ronald Page).

Luminescent substance for electric discharge vessels. No. 438,832. Societe Anonyme pour les Applications de L'Electricite et des Gas Rares-Etablissements Claude-Paz et Silva. (Pierre Lemaigre-Voreaux).

A heat exchange device for cooling a stream of fluid. No. 438,836. Niagara Blower Company. (Martin H. Olstad and Allan E. Williams).

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

425,426. National Lead Co., New York, N. Y.; filed Mar. 8, 1944; Serial No. 468,084; for strip and wire solders incorporating or treated with flux; since February 1944.

425,460. Sears, Roebuck & Co., Chicago, Ill.; filed Oct. 5, 1945; Serial No. 489,493; for water-repellent toxic wood preservative; since July 1939.

425,468. Dominion Chemical Co. Inc., New York, N. Y.; filed Dec. 5, 1945; Serial No. 492,694; for fuel oil tank treatment in liquid form; since July 1936.

426,070. American Grease Stick Co., Muskegon Heights, Mich.; filed Jan. 5, 1946; Serial No. 494,298; for lubricating grease; since February 1940.

444,282. Society of Chemical Industry in Basle, Basel, Switzerland; filed June 6, 1941; for coal tar colors, textile assistants and auxiliaries; since Feb. 2, 1906.

444,284. Society of Chemical Industry in Basle, Basel, Switzerland; filed June 6, 1941; for coal tar colors, textile assistants and auxiliaries; since Mar. 28, 1907.

473,705. Pittsburgh Chemical Laboratory, Pittsburgh, Pa.; filed Aug. 29, 1944; for general cleaning and washing purposes; since May 15, 1941.

482,216. Noble Chemical Corp., Chicago, Ill.; filed Apr. 16, 1945; for chemical cleaning compounds; since Jan. 4, 1943.

482,820. Lyman B. Warren, Jr., as Aloyl Co., St. Paul, Minn.; filed Apr. 30, 1945; for chemical preparations comprising degreasing fluid; since Jan. 1, 1937.

483,321. International Metal Polish Co., Inc., Indianapolis, Ind.; filed May 14, 1945; for rubbing compound adapted for cleaning metal, lacquered and enameled surfaces; since March 1912.

485,809. Arrow Engineering & Chemical Co., Inc., Flint, Mich.; filed July 14, 1945; for insect spray, mouse poison, volatile insecticide, and roach powder; since July 5, 1945.

486,546. Piezo Manufacturing Corp., New York, N. Y.; filed July 31, 1945; for cleaners, soaps and cleaning compounds; since July 15, 1945.

491,150. California Spray-Chemical Corp., Wilmington, Del., and Richmond, Calif.; filed Nov. 6, 1945; for parasiticides; since Sept. 11, 1945.

491,154. A. P. Desanno & Son, Inc., Phoenixville, Philadelphia, Pa.; filed Nov. 6, 1945; for resin bonded grinding wheels; since Sept. 1, 1945.

491,476. Joseph Handler, as Mercer Oil & Chemical Co., Philadelphia, Pa.; filed Nov. 13, 1945; for cleaning fluid; since Aug. 17, 1945.

492,318. Electro Manganese Corp., Knoxville, Tenn.; filed Nov. 28, 1945; for metallic manganese; since June 23, 1945.

493,541. Charles G. Fallon, Boston, Mass.; filed Dec. 19, 1945; for precision tubing of steel, ferrous and non-ferrous metal and plastic material; since Jan. 1, 1945.

493,860. Van Syoc Industries, Detroit, Mich.; filed Dec. 22, 1945; for rust-proof alloy of lead, tin, and bismuth; since July 1943.

494,051. Floquil Products, Inc., New York, N. Y.; filed Dec. 29, 1945; for stains, varnishes, lacquers, paint enamels, pigments in dry and paste form; since Jan. 16, 1941.

494,072. Ingram Chemical Laboratories, Chicago, Ill.; filed Dec. 29, 1945; for ready-mixed interior and exterior paints; since Nov. 15, 1945.

494,693. The Mathieson Alkali Works (Inc.), New York, N. Y.; filed Jan. 12, 1946; for cleaning cream and milk cans; since Sept. 18, 1944.

495,335. Royal Petroleum Corp., New York, N. Y.; filed Jan. 24, 1946; for gasoline; since Nov. 10, 1945.

495,586. "Coffette" Products, Inc., Brooklyn, N. Y.; filed Jan. 29, 1946; for treatment of textile fibers and fabrics; since Oct. 2, 1944.

496,243. George Kay, West Orange, N. J.; filed Feb. 8, 1946; for paint in dry powder form; since Feb. 1, 1945.

496,287. Union Bay State Chemical Co. Inc., Cambridge, Mass.; filed Feb. 8, 1946; for chlorinated synthetic rubber in powder form; since Jan. 22, 1946.

496,490. United States Rubber Co., New York, N. Y.; filed Feb. 12, 1946; for aqueous emulsions of thermoplastic resins; since Jan. 25, 1946.

497,007. Affiliated Retailers, Inc., New York, N. Y.; filed Feb. 21, 1946; for dry cleaner; since Dec. 15, 1945.

497,089. General Solvents Sales Co., Inc., Rochester, N. Y.; filed Feb. 23, 1946; for liquid solvent and cleaner for removing tar, wax, oil and grease; since Dec. 7, 1945.

497,183. Kendall Refining Co., Bradford, Pa.; filed Feb. 25, 1946; for liquid petroleum hydrocarbon solvents; since Dec. 31, 1945.

497,404. Palmer Show Card Paint Co., Inc., Detroit, Mich.; filed Feb. 28, 1946; for polishing glass, nickel, chrome, metal, enamel, and tile surfaces; since Sept. 6, 1939.

498,134. The Glidden Co., Cleveland, Ohio; filed Mar. 13, 1946; for mechanically refined vegetable protein materials for use in making adhesives, plastics, paints, insecticides, sizings; since Jan. 10, 1939.

498,192. West Disinfecting Co., Long Island City, N. Y.; filed Mar. 13, 1946; for insecticides; since Sept. 28, 1945.

498,300. Midland Laboratories, Dubuque, Iowa; filed Mar. 15, 1946; for waxes; since Feb. 28, 1946.

498,696. The Herbert Chemical Co., Cincinnati, Ohio; filed Mar. 21, 1946; for material to clean type and rollers; since Feb. 15, 1936.

498,877. American Basic Chemicals, Inc., Baltimore, Md.; filed Mar. 25, 1946; for cleaning compounds in powder form having water softening properties; since Apr. 20, 1945.

499,017. O. M. Scott & Sons Co., Marysville, Ohio; filed Mar. 26, 1946; for weed control; since Mar. 11, 1946.

499,291. Socony-Vacuum Oil Co., Inc., New York, N. Y.; filed Mar. 29, 1946; for compounded oil to increase absorbency of cellulose products; since Mar. 4, 1946.

499,922. Standard Oil Co. of New Jersey, Wilmington, Del.; filed Apr. 9, 1946; for reducing viscosity of oils; since Sept. 18, 1945.

500,142. Standard Varnish Works, Staten Island, N. Y.; filed Apr. 12, 1946; for baking enamel applied to metal, plastic, and composition surfaces; since Jan. 29, 1946.

500,652. Merwyn C. Gill as Peerless Plastic Products, Montebello, Calif.; filed Apr. 22, 1946; for fibrous material in sheet form impregnated and/or coated with plastic; since Jan. 2, 1946.

500,705. J. N. Sharma, Los Angeles, Calif.; filed Apr. 22, 1946; for chemically prepared ice; since Apr. 13, 1946.

501,861. Monsanto Chemical Co., St. Louis, Mo.; filed May 10, 1946; for synthetic resins; since Apr. 29, 1946.

502,650. McCallum, Devitt & Ford, Chicago, Ill.; filed May 23, 1946; for luminescent plastic molding powders; since Mar. 18, 1946.

506,546. Permanente Cement Co., Oakland, Calif.; filed July 30, 1946; for plastic monolithic refractories; since Nov. 11, 1945.

509,439. National Filter Corp., New York, N. Y.; filed Sept. 20, 1946; for filtering material made of cellulose fibers; since Aug. 30, 1946.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, November 19 - December 10.

CHEMICAL INDUSTRIES INFORMATION SERVICE

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160.	Snell, Foster D., Inc.	527
161.	Sobin, Irving M., Co., Inc.	523
162.	Solvay Sales Corp.	Inside Front Cover
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1. For fortification of spent oleum, making possible a ready supply of any strength oleum.
2. In benzenoid sulfonations for elimination of mixed sulfonates: meta- only or ortho- and para- derivatives only are formed.
3. For di- and poly-sulfonations of aryl compounds.
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6. For formation of addition compounds with amines, valuable in organic synthesis.

Sulfuric Anhydride exists in three chemically equivalent physical modifications as indicated by data below. General Chemical's stabilized product is almost entirely Gamma-Form and its partially stabilized product is largely Beta-Form.

PROPERTY	GAMMA-FORM	BETA-FORM	ALPHA-FORM
Description	Ice-Like	Asbestos-Like	Asbestos-Like
Equilibrium Melting Point (°C):	16.8	32.5	62.3
Density (20°C)	1.9255	—	—
Sp. Ht. (cals/gm) (20°C)	0.77	—	—
Ht. of Fusion (cals/mol)	1,800	2,900	6,200
Ht. of Sublimation (cals/mol)	11,900	13,000	16,300
Ht. of Dilution (cals/mol)	40,340	—	—
Vapor Pressure (mm.)			
0°C	45	32	5.8
25	433	344	73
50	950	950	650
75	3,000	3,000	3,000

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